Summary of the 2001 British Columbia Sablefish (*Anoplopoma fimbria*) Research and Assessment Survey

M.R. Wyeth, A.R. Kronlund, and M. Elfert

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia
V9T 6N7

2003

Canadian Data Report of Fisheries and Aquatic Sciences 1118

Fisheries and Oceans | Pêches et Océans

Canadian Data Report of
Fisheries and Aquatic Sciences

Data reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of data reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Data reports are not intended for general distribution and the contents must not be referred to in other publications without prior written authorization from the issuing establishment. The correct citation appears above the abstract of each report. Data reports are abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1 - 25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26 - 160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was introduced with the publication of report number 161.

Data reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport statistique canadien des
sciences halieutiques et aquatiques

Les rapports statistiques servent à classer et à archiver les compilations de données pour lesquelles il y a peu ou point d'analyse. Ces compilations auront d'ordinaire été préparées à l'appui d'autres publications ou rapports. Les sujets des rapports statistiques reflètent la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports statisiques ne sont pas destinés à une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports statisiques sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 25 de cette série ont été publiés à titre de relevés statistiques, Services des pêches et de la mer. Les numéros 26 à 160 ont été publiés à titre de rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 161.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Data Report of

Fisheries and Aquatic Sciences 1118

2003

SUMMARY OF THE 2001 BRITISH COLUMBIA SABLEFISH *(Anoplopoma fimbria)* RESEARCH AND ASSESSMENT SURVEY

by

M.R. Wyeth[1], A.R. Kronlund[1], and M. Elfert[2]

[1]Fisheries and Oceans Canada

Science Branch, Pacific Region

Pacific Biological Station

Nanaimo, British Columbia

V9T 6N7

[2]Archipelago Marine Research Ltd.

525 Head Street

Victoria, British Columbia

V9A 5S1

© Her Majesty the Queen in Right of Canada 2003
Cat. No. Fs 97-13/1118E ISSN 0706-6465

Correct citation for this publication:

Wyeth, M.R., A.R. Kronlund, and M. Elfert. 2003. Summary of the 2001 British Columbia Sablefish (*Anoplopoma fimbria*) research and assessment survey. Can. Data Rep. Fish. Aquat. Sci. 1118: 54p.

104-01410/

TABLE OF CONTENTS

LIST OF TABLES IV

LIST OF FIGURES V

ABSTRACT VI

1.0 INTRODUCTION 1

2.0 METHODS 1

2.1 Survey Vessel 2
2.2 Survey Localities 2
2.2.1 Indexing Localities 2
2.2.2 Tagging Localities 2
2.2.3 Mainland Inlet Localities 2
2.2.4 Escape-Ring Localities 2
2.3 Depth Strata 2
2.4 Fishing Gear and Operations 3
2.5 Catch Composition and Effort Data Collection 4
2.5.1 Indexing Sets 4
2.5.2 Tagging Sets 4
2.5.3 Escape-ring Study 4
2.6 Catch Processing 5
2.6.1 Recovered Tagged Sablefish 5
2.6.2 Biological Samples 5
2.6.3 Tagging 5
2.7 Oceanographic Sampling 6

3.0 RESULTS 7

3.1 Catch Rates 7
3.2 Catch Composition 7
3.3 Sablefish Sampling and Tagging 8

ACKNOWLEDGEMENTS 8

REFERENCES 9

TABLES 11

FIGURES 23

APPENDICES 28

LIST OF TABLES

TABLE 1. SABLEFISH RESEARCH AND ASSESSMENT SURVEYS CONDUCTED FROM 1988 TO 2001. 11

TABLE 2. LOCALITIES VISITED DURING SABLEFISH RESEARCH AND ASSESSMENT SURVEYS FROM 1990 THROUGH 2001 SHOWING THE NUMBER OF INDEXING (I) AND TAGGING (T) SETS COMPLETED AT EACH LOCALITY. SURVEYS CONDUCTED IN 1988 AND 1989 ARE NOT SHOWN AS THE FISHING PROTOCOLS WERE NOT CONSISTENT WITH THE 1990-2001 TIME SERIES. 12

TABLE 3. SABLEFISH RESEARCH AND ASSESSMENT SURVEY DEPTH STRATA. 14

TABLE 4. ESCAPE-RING STUDY LOCALITIES AND TARGET DEPTH RANGES. 15

TABLE 5. SUMMARY OF SPECIES CAPTURED DURING THE 2001 SABLEFISH RESEARCH AND ASSESSMENT SURVEY. 16

TABLE 6. SUMMARY OF SABLEFISH RECOVERED, TAGGED AND SAMPLED DURING THE 2001 SURVEY. FISH SAMPLED DURING ESCAPE-RING STUDY SETS ARE NOT INCLUDED. THE MEAN FORK LENGTHS AND PROPORTION OF MALES REFER TO THE SAMPLED FISH ONLY, AND DOES NOT INCLUDE RECOVERED TAGGED FISH OR TAG RELEASES. 18

TABLE 7. SUMMARY OF SABLEFISH TAGGED AND RELEASED DURING SURVEYS FROM 1994 TO 2000 SHOWING TOTALS FOR INDEXING (I) AND TAGGING (T) SETS BY LOCALITY AND YEAR. 20

TABLE 8. SUMMARY OF SABLEFISH SAMPLED FROM ESCAPE-RING STUDY SETS DURING THE 2001 SURVEY. 22

LIST OF FIGURES

FIGURE 1. LOCATIONS OF NORTHERN INDEXING AND TAGGING SETS COMPLETED DURING THE 2001 SABLEFISH RESEARCH AND ASSESSMENT SURVEY. 23

FIGURE 2. LOCATIONS OF SOUTHERN INDEXING AND TAGGING SETS COMPLETED DURING THE 2001 SABLEFISH RESEARCH AND ASSESSMENT SURVEY. 24

FIGURE 3. LOCATIONS OF ESCAPE-RING STUDY SETS COMPLETED DURING THE 2001 SABLEFISH RESEARCH AND ASSESSMENT SURVEY. 25

FIGURE 4. DIAGRAMS OF FISHING GEAR USED DURING SABLEFISH RESEARCH AND ASSESSMENT SURVEYS. THE LEFT PANEL SHOWS A MODIFIED KOREAN TRAP. THE RIGHT PANEL SHOWS THE COMPONENTS OF A SET OR STRING OF TRAP GEAR. 26

FIGURE 5. DISTRIBUTION OF CATCH RATES FOR INDEXING, TAGGING, AND INLET SETS SUMMARIZED BY BOXPLOTS FOR EACH YEAR. THE FILLED CIRCLES SHOW THE MEAN ANNUAL CATCH RATES. THE SHADED RECTANGLE INDICATES AN APPROXIMATE 95 PERCENT CONFIDENCE INTERVAL ON THE MEDIAN ANNUAL CATCH RATE. 27

ABSTRACT

Wyeth, M.R., A.R. Kronlund, and M. Elfert. 2003. Summary of the 2001 British Columbia Sablefish (*Anoplopoma fimbria*) research and assessment survey. Can. Data Rep. Fish. Aquat. Sci. 1118: 54p.

This document provides a summary of the methodology and results of the 2001 British Columbia sablefish research and assessment survey. The 2001 survey continued the time series of annual fall surveys that was initiated in 1988 and standardized beginning in 1990. Fishing of longline trap gear was conducted at selected offshore and mainland inlet localities. The survey included two main components: (1): standardized indexing sets to provide a catch rate based abundance index, and (2) tagging sets for release of marked fish for tag-recovery analyses. The F.V Ocean Pearl conducted a total of 134 sets at 27 localities. Thirteen offshore indexing localities, six offshore tagging localities and five mainland inlet localities were visited. In addition to the indexing and tagging components, the 2001 survey also included experimental fishing designed to examine the effects of escape-rings installed on the traps. A total of nine escape ring study sets were conducted at eight offshore localities.

The distribution of catch rates in 2001 for the offshore indexing sets was the lowest in the time series while the catch rates for tagging and inlet sets were comparable to earlier surveys. Of the 24,000 sablefish captured, 18,248 were tagged and released, 903 previously tagged sablefish were recovered, and 3,981 were sampled for biological data. Approximately one thousand of the sampled sablefish were also examined for stomach contents.

RÉSUMÉ

Wyeth, M.R., A.R. Kronlund, and M. Elfert. 2003. Summary of the 2001 British Columbia Sablefish (*Anoplopoma fimbria*) research and assessment survey. Can. Data Rep. Fish. Aquat. Sci. 1118: 54p.

Est présenté dans ce document un résumé des méthodes de recherche et d'évaluation de la morue charbonnière et des résultats du relevé effectué en Colombie-Britannique en 2001. Ce relevé constitue une suite à la série chronologique de relevés annuels d'automne débutée en 1988 et normalisée depuis 1990. Il a été effectué à la trappe dans divers sites en haute mer et continentaux : (1) des mouillages d'indexation normalisés pour obtenir un indice d'abondance fondé sur le taux de capture et (2) des mouillages pour l'étiquetage et la remise à l'eau de poissons aux fins d'analyses des étiquettes récupérées. Le navire de pêche *Ocean Pearl* a effectué un total de 134 mouillages à 27 endroits. Treize sites d'indexation en haute mer, six sites de marquage en haute mer et cinq sites dans les inlets continentaux ont été visités. En plus de l'indexation et du marquage, le relevé de 2001 a également comporté une pêche expérimentale afin d'examiner les effets des anneaux de sortie installés sur les pièges. Au total, neuf traits ont été effectués à cette fin à huit endroits en haute mer.

La distribution des taux de capture en 2001 pour les mouillages d'indexation en haute mer a été la plus faible depuis le début de la série chronologique (1988), tandis que les taux de capture au cours des mouillages dédiés au marquage et des mouillages dans les inlets étaient comparables à ceux des relevés antérieurs. Parmi les 24 000 morues charbonnières capturées, 18 248 ont été étiquetées et relâchées, 903 étaient déjà étiquetées et 3 981 ont été échantillonnées aux fins d'analyses biologiques. Le contenu stomacal d'environ mille poissons échantillonnés a également été étudié.

1.0 INTRODUCTION

Sablefish (*Anoplopoma fimbria*) are an abundant and commercially valuable species throughout their range in the North Pacific. They have a long history of exploitation in Canadian waters with landings reported as early as the early 1800s (McFarlane and Beamish, 1983a). British Columbia fishers harvest sablefish with longline trap, longline hook, and trawl gear along the continental shelf at depths up to 1800 m. The British Columbia sablefish fishery landed an average of approximately 4000 metric tons annually for the period 1997 to 2001. The majority of the fish (>75%) was captured using trap gear.

In 1988 an annual sablefish research and assessment survey of the British Columbia coast was initiated. For details of how the annual sablefish survey has expanded and changed over the years, see Wyeth and Kronlund (2003). Each year, fishing was conducted at selected localities using trap gear consistent with the commercial fishery. The fishing protocol was refined over the first few years but was standardized beginning in 1990. These standardized "indexing sets" were designed to track trends in abundance and biological characteristics at the selected localities. In addition to the indexing component of the annual survey, sablefish were tagged and released beginning in 1991. In 1994, "tagging sets" specifically for capturing sablefish for tag and release became part of the annual survey and in 1995, localities specifically for tagging and releasing sablefish were added.

The 2001 survey was a continuation of the annual sablefish research and assessment survey 1990 to 2000 time series and followed the same protocols for fishing gear, catch monitoring, biological sampling, and tagging. Indexing and tagging sets were conducted at offshore and mainland inlet localities. In addition, sets were conducted that were designed to study the effects of escape-rings installed in the traps.

This document summarises the methods and results of the 2001 survey and consists of a main body of text with supporting appendices. Tables and figures referred to in the main text are sequentially numbered. Tables and figures in the appendices are labelled with the letter code of the appendix and a sequential number, e.g. Table A.2 for the second table in Appendix A. For details on surveys conducted from 1988 through 1993, see Smith et al. (1996); for surveys in 1994 and 1995 see Downes et al. (1997); for surveys from 1996 to 2000 see Wyeth and Kronlund (2003). For details concerning tag releases from 1977 through 1981 see Beamish et al. (1978, 1979, 1980, and 1983) and for tag releases from 1982 through 1987 see Murie at al. (1995).

2.0 METHODS

The 2001 survey followed protocols that have evolved over the 12 year life of the annual survey. Sets were made at selected offshore and mainland inlet localities along the British Columbia coast. Sets were of two types: 1) "indexing" sets had rigorous gear requirements and were used to collect standardized catch data to examine trends in abundance and biological characteristics of the fish; 2) "tagging" sets had less rigorous gear requirements and were designed specifically to capture sablefish for tag and release. The protocol for indexing sets developed over the first few years of the time series and was standardized beginning in 1990.

The protocol for tagging sets has been standardized since 1996. In addition to the indexing and tagging component, the 2001 survey included experimental fishing designed to study the effects of escape-rings installed in the traps.

2.1 SURVEY VESSEL

The F/V Ocean Pearl was chartered to conduct the 2001 Sablefish Research and Assessment Survey. The vessel, skippered by Mike Derry, completed a total of 134 sets from October 6 to November 6 2001 (Table 1, Appendix A).

2.2 SURVEY LOCALITIES

A total of 23 indexing, tagging, and mainland inlet localities were visited in 2001 (Table 2). Sets were also made at four additional localities specifically for the escape-ring study.

2.2.1 Indexing Localities

Thirteen offshore indexing localities were visited in 2001. From north to south they were Langara Island/North Frederick, Louis Point to Frederick Island, Kunakun Point, Hippa Island, Buck Point, Tasu Sound to Marble Island, Gowgaia Bay, Flamingo Inlet, Cape St. James, Triangle Island, Quatsino Sound, Esperanza Inlet, and Barkley Canyon (Figure 1 and Figure 2). The Louis Point to Frederick Island, Kunakun Point, Tasu Sound to Marble Island, and Flamingo Inlet localities were specifically for deepwater sets and sets were not made in the five standard depth strata in these localities (see section 2.3).

2.2.2 Tagging Localities

Six offshore tagging localities were visited in 2001. From north to south they were Rennell Sound, Tasu Sound, Middle Ground/ Mitchell's Gully, Pisces Canyon, Estevan Point, and Father Charles Canyon (Figure 1 and Figure 2).

2.2.3 Mainland Inlet Localities

Four mainland inlet localities were visited in 2001. From north to south they were Portland Inlet, Gil Island, Finlayson Channel, and Dean/Burke Channel (Figure 1).

2.2.4 Escape-Ring Localities

For the escape-ring study, three fisher logbook records of commercial trap sets were randomly selected from each of three broader areas. The broader areas were three the west coast of Vancouver Island (WCVI), Queen Charlotte Sound (QCS), and the west coast of the Queen Charlotte Islands (WCQCI). The localities selected for the escape-ring study are shown in Table 4 and Figure 3 shows the set locations.

2.3 DEPTH STRATA

Within the localities, the skipper had discretion over the exact location of all sets providing the sets were made in the specified depth ranges.

Indexing sets made at the offshore indexing localities were targeted at five standard depth strata: 272-457 m (150-250 fm), 457-641 m (250-350 fm), 641-824 m (350-450 fm), 824-1006 m (450-550 fm), and deeper than 1006 m (550 fm, Table 3). One indexing set was made in each of the five standard depth strata at each indexing locality.

Indexing sets were also targeted at three deep depth strata at the West Coast of Vancouver Island indexing localities: 1188-1280 m (650-700 fm), 1280-1463 m (700-800 fm), and deeper than 1463 m (800 fm, Table 3). Off the Queen Charlotte Islands, the deepwater sets were targeted at depths from 1188 m (600fm) to 1463 m (800 fm, Table 3). Three sets were made at each of the Louis Point to Frederick Island, Kunakun Point, Gowgaia Bay, and Flamingo Inlet localities. In addition, six deep sets were made at the Tasu Sound to Marble Island locality.

Sets at the mainland inlet localities were made at the prevailing depth of the set location (Table 3). Fishing within specific depth strata is not possible because of the steep-sided bathymetry of the inlets. Five sets were made at each mainland inlet locality.

To maximise the number of releases per set, offshore tagging sets were targeted where the highest catch rates were expected at 457-824 m (250-450 fm, Table 3). Four tagging sets were made at each tagging locality and one tagging set was made at each of the standard offshore indexing localities. No tagging sets were made at the deepwater specific indexing localities.

For the escape-ring study sets, the depth of the randomly selected commercial set was used as the target depth. A 183 m (100 fm) depth range around the target depth (target +/- 50 fm) was selected so that the entire string could be expected to fall within the specified depth range. One set was conducted at each of the nine escape-ring study localities (Table 4).

An analysis of tag recoveries during surveys was conducted in 2001 (Haist et al, 2001). Examination of the geographic location of the release sets showed that some of the sets completed in 1999 were repeated in 2000. Further, the recapture rate of fish tagged in 1999 was remarkably high for the set in 2000 in the corresponding position. In an effort to further investigate this phenomenon in 2001, the skipper was asked to repeat the positions of some specific sets if possible. A list of 30 sets to repeat was supplied with 14 selected as the most desirable (Appendix A). However, Mr Derry chose to repeat most of the 2000 survey set positions.

2.4 FISHING GEAR AND OPERATIONS

The fishing gear and operations used in 2001 were consistent with the protocol of surveys from 1990 onwards (Wyeth and Kronlund, 2003). All sets were made using the F/V Ocean Pearl's longline trap gear which is typical of that which is employed in the commercial sablefish trap fishery. For a more detailed description of the survey fishing gear and setting and hauling procedures, see Wyeth and Kronlund (2003). Briefly, a set or "string" of longline trap gear consisted of a line resting on the ocean floor (groundline) with baited traps attached at intervals along its length. The groundline was secured to the ocean floor by anchors at each end and the location of the string was marked by floats attached to the groundline by anchorlines (Figure 4).

The start and end positions of each set were recorded from the vessel's global positioning system (GPS) when the first and last anchors were set over the stern. The start and end bottom depths were recorded from the vessel's depth sounder when the respective anchors were set. The mean bottom depth was calculated as the average of depth recordings from the vessel's depth sounder at one-minute intervals between the first and last anchors being set. The duration, or

soak time, of the set was calculated as the time elapsed between the first anchor being set over the stern and the first anchor hauled aboard. Appendix Figure C.1 shows an example of a completed bridge log data form.

All indexing sets made in the five standard depth strata were made using traps with black mesh. However, some of the traps used during deepwater and tagging sets had heavier green web. All traps had two 86 mm (3 7/8 inch internal diameter) stainless steel escape rings sewn shut with net twine.

Indexing sets were made using strings of 25 traps, each trap baited with an approximately 1 kg block of frozen squid in a bait bag. Tagging sets consisted of strings of approximately 70 traps baited with a combination of a 1 kg block of frozen squid in a bait bag and approximately 3 kg of frozen hake loose in the trap.

Escape-ring study sets consisted of 40 traps each baited with approximately 1 kg of frozen squid in a bait bag and approximately 3 kg of frozen hake loose in the trap. Traps were deployed for as close to 36 hours (2160 minutes) as possible. Each set had traps that alternated between two treatments: 1) two open 86 mm (3 7/8 inch internal circumference) stainless steel circular escape-rings installed in the trap or 2) the same two escape-rings but sewn shut with net twine.

2.5 CATCH COMPOSITION AND EFFORT DATA COLLECTION

2.5.1 Indexing Sets

For indexing sets, the catch of every species in each trap was counted and weighed. All weights were taken using a Marel M1100 portable, motion-compensating electronic platform balance. Small animals weighing less than 1 kg were not always weighed and large catches of small animals were not always counted. Effort data were collected by tallying each trap as it was hauled aboard. Any damage to the trap was noted and necessary repairs were affected before the trap was set again. Figure C.3 shows an example of a completed catch log form from an indexing set.

2.5.2 Tagging Sets

For tagging sets, the total catch of sablefish was determined by summing the number of tagged fish, the number of sampled fish, the number of recovered tagged sablefish, and the number of dead fish. The sablefish catch weight was estimated by summing estimated weights of each measured fish. The weight of each fish was estimated using a length/weight conversion of the form $w = 9.313 * 10^{-6} (l)^{3.015}$ where w is the weight in grams and l is the fork length in mm. Other species caught were not recorded and effort data were recorded as the crew's estimates of the number of traps deployed.

2.5.3 Escape-ring Study

For the escape-ring study sets, the condition of the traps' escape rings (open or sewn shut) was verified after the catch was dumped into the sorting area. The catch of every species in each trap was counted and weighed. The sablefish were killed and then transferred to plastic baskets labelled with the trap number. Figure C.3 shows an example of a catch log form from an escape-ring study set.

2.6 CATCH PROCESSING

2.6.1 Recovered Tagged Sablefish

Previously tagged sablefish recovered during survey sets were set aside as the catch was sorted. These fish were sacrificed and sampled after hauling and tagging for each set had finished. The fish were measured for fork length in millimetres (mm). Abdominal cavities were opened and the gonads were examined to determine the fish sex and visually estimate the state of maturity (Appendix D). Otoliths were collected for subsequent age determination. Sagital otoliths were excised from the fish, cleaned, and stored in 50% glycerine and 3% thymol solution in Tres Bien plastic trays. Due to time limitations following some sets, the tag identification numbers of the recovered tagged fish were recorded and the fish were frozen whole to be sampled on shore. The round body weights (dekagrams) of these fish were also recorded. Figure C.4 shows an example of a completed recovered tagged sablefish sampling form.

2.6.2 Biological Samples

Sablefish from selected traps throughout the indexing sets were used for biological samples. The goal was to obtain a sample of at least 50 fish per set. The specific selection method depended on the sablefish catch rate and varied from every trap, to every second or third trap, to an ad hoc selection of traps spaced throughout the string. The entire catch of sablefish from each selected trap was sampled. Sampling was conducted after all traps in the set were hauled aboard and tagging was completed. Sablefish were measured for fork length (L) in millimetres (mm). The abdominal cavities of fish were opened and the gonads were examined and the sex (S) and a visual estimate of the state of maturity (M, Appendix D) were recorded. Otoliths were collected for subsequent age determination (O). Otoliths were excised from the fish, cleaned, and stored in 50% glycerine and 3% thymol solution in Tres Bien plastic trays. In addition to the morphometric measurements, the stomachs of fish from selected sets were opened and the contents examined and identified to the lowest possible taxon along with an estimate of the volume and relative digestion (fresh, ¼ digested, ½ digested, ¾ digested, or fully digested). Figure C.5 and Figure C.6 show examples of completed biological sampling forms.

2.6.2.1 Escape-ring study. All the sablefish from the escape ring study sets were sampled. Sampling occurred as the set was being hauled aboard. The trap that each fish was captured in was recorded. The fork length was measured and the sex and maturity state were recorded as described in section 2.6.2 (LSM). In addition, any fish that were stuck in the escape rings were also measured for girth (largest circumference in mm). Figure C.7 shows an example of a completed escape-ring study biological sampling form.

2.6.3 Tagging

2.6.3.1 Indexing Sets. Sablefish in excess of the biological sampling requirements for indexing sets were tagged. Fish to be tagged were transferred from the sorting area using plastic baskets to one of two 2400 litre fibreglass holding tanks secured to the vessels' deck. The tanks received continuous supplies of fresh seawater from the vessel's fire pump system. Fish were removed by hand or with a dip-net from the tank and then measured for fork length to the nearest millimetre on a wooden measuring board. A Floy FD-68BC T-bar anchor tag was inserted on the left side of the fish at the base of the dorsal fin using a Mark II Long Tagging gun. The tag

was injected approximately 1 cm below, and 2-3 cm behind the anterior insertion of the first dorsal fin. The tag was angled into the fish so the tag could stream and the vertebral column and internal organs would not be damaged. Any significant injuries to the fish were recorded prior to the fish being released. Figure C.8 shows an example of a completed tagging form.

2.6.3.2 Tagging Sets. During tagging sets, sablefish were transferred directly from the sorting area to the holding tank using either plastic baskets or PVC pipe slides with running seawater. Fish from an ad hoc selection of traps spaced throughout one of the strings in each locality provided a biological sample of approximately 50 fish per set. All the sablefish from selected traps were sampled for fork length, sex, maturity, and otoliths (LSMO) after tagging was completed.

During 2001 the goal was to tag and release 2000 fish in each tagging locality. Although this goal was only achieved at the Estevan Point and Middle Ground localities, no additional sets were made. At the Middle Ground locality the goal was reached prior to hauling the last set (54). The sablefish catch from this set was neither tagged nor sampled, rather it was retained and processed by the F/V Ocean Pearl to be landed as commercial catch.

2.6.3.3 Tag Types. Until 1999, sablefish were tagged with a Floy "B99-type" tag with a number of the structure B99##### printed on one side and "REWARD PACIFIC BIO. STATION NANAIMO, B.C. CANADA" printed on the other. In 2000, a new "CSA-type" tag was introduced with different printed information. The tag number had the structure CSA##### and "REWARD CANADIAN SABLEFISH ASSOC.NANAIMO, B.C. CANADA" printed on the back. Both tag types were used again in 2001. In an effort to test for a difference in tag return rates between the two tag types, the two tag types were released in equal numbers. Approximately half of the fish from tagging sets off the West Coast of Vancouver Island in 2000 were tagged with each tag type. In each set, the tag types were applied in alternating batches of 100 tags. In 2001 the vessel was equipped with two tagging tanks. The tagging crew at one tank would use one tag type while the crew at the other tank used the other type. The tag types were then switched for the next set. The entire sablefish catch of each trap was assigned to one or other of the tanks by alternating between traps. The catch from one trap would go to one tank and the catch from the next trap would go to the other tank. For indexing sets, and tagging sets where few fish were encountered, only one tagging tank was used and alternating equal batches of 60-100 fish were tagged with each tag type.

Analyses of recoveries of tagged fish to date indicate no significant difference in return rates between the two tag types (Haist et al. 2001, Kronlund et al 2003).

2.7 OCEANOGRAPHIC SAMPLING

A VEMCO MiniLog TD or TDR (temperature or temperature/depth) recorder was attached to a trap on selected sets. These data will be summarised elsewhere.

3.0 RESULTS

3.1 CATCH RATES

The distribution of catch rates (number of sablefish/number of traps) achieved for each set is summarized by a boxplot by year for each of the offshore indexing, offshore tagging and inlet indexing set types (Figure 5). The lower bound of the box indicates the first quartile (25^{th} percentile) of the data and the upper bound of the box indicates the third quartile (75^{th} percentile). The horizontal line that divides the box is the median (50^{th} percentile). The upper and lower whiskers are positioned at 1.5 times the inter-quartile range. Open circles indicate data values that fall outside the whiskers, or outliers. A filled circle represents the mean value of the data summarized in the boxplot. The lightly shaded rectangle positioned in each box represents an approximate 95 percent confidence interval for the sample median. The nominal data are presented here with no attempt to filter data or standardize for other factors. Traps that were open, holed or fouled were excluded from the calculation of catch rates. In addition, some specific sets were also excluded (Appendix E). The 1988 and 1989 surveys are not shown as the fishing protocol was significantly different than in subsequent years. Nonetheless, the fishing protocol has varied over the time period shown. Specifically, the most recent surveys spanned a greater range of depths than the early surveys. In addition, baiting practices have not been consistent. Deep indexing sets in 1999 were baited with both squid and hake and the amount of hake used in tagging sets varied from year to year (Wyeth and Kronlund, 2003).

High catch rates were achieved during indexing sets in the first 4 years of the survey but catch rates from 1994 onwards have been at a consistent, lower level (Figure 5). In years when both offshore indexing and offshore tagging sets were conducted, the catch rates for tagging sets were greater. This is likely due to the presence of hake bait in the tagging set traps. Catch rates at the mainland inlet localities were greater than at any of the offshore localities. There was a sharp increase in catch rates at the inlet localities in 1999.

Catch rates of indexing sets in 2001 had the lowest and least variable distribution of the time series (Figure 5). In contrast, the catch rates of tagging and mainland inlet sets were within the range of previous years.

Details on the number of sablefish captured, sampled, tagged, and recovered tags for specific sets are shown in Appendix F. Catch rates at the deep water localities off the Queen Charlotte Islands were very low. Indeed, sablefish were not captured during sets 83, 102, 106 and 107.

3.2 CATCH COMPOSITION

Forty four species or taxonomic groups were captured during the 2001 survey (Table 5). Other than sablefish, the most common species in order of total weight captured were rougheye rockfish, pectoral rattail, arrowtooth flounder, roughscale rattail, Pacific halibut, and Pacific sleeper sharks. Only 8 Pacific sleeper sharks were captured but the large size of this species translated into a significant weight. Other species accounted for only small fractions of the total catch.

3.3 SABLEFISH SAMPLING AND TAGGING

A total of 903 previously tagged sablefish were recovered and 18,248 sablefish were tagged and released during the 2001 survey (Table 6). In addition, 2,670 sablefish were sampled, 1,097 of which were examined for stomach contents (Table 6). The fork length distributions of sablefish sampled and tagged during indexing and tagging sets are shown for each locality in Figure G.1.

Beginning in 1999 a single tagging set was added at each indexing locality. In every year since then, most or all of the sablefish tagged at the indexing localities were tagged during the tagging set (Table 7). No sablefish were tagged and released at the deep water specific localities off the Queen Charlotte Islands.

A total of 1311 sablefish were sampled during the escape-ring study sets (Table 8). Roughly half of the sablefish sampled from the escape-ring sets were male. Nonetheless, the sex ratio varied among localities from roughly 30 % to 75 % males. The fork length distributions of sablefish sampled and tagged during escape-ring sets are shown for each locality in Figure G.2.

ACKNOWLEDGEMENTS

We are grateful for the review of this document provided by Andrew Fedoruk. This document reflects the contributions of many individuals. The Canadian Sablefish Association provided coordination and support the 2001 survey, as has been done for surveys since 1994. The staff of Archipelago Marine Research (AMR) assisted in the preparation of the scientific equipment and provided scientific staff for the survey. The scientific staff that conducted the survey were Malcolm Wyeth (Department of Fisheries and Oceans, Canada), Margo Elfert (AMR), Tucker Soltau (AMR), and Josef Wasilewski (AMR). A special thanks is given to the skipper and crew of the F/V Ocean Pearl without whom the survey would not have been completed: Mike Derry, Kelly Bodnarek, Richard Foster, William Woodbury, Hugo Mallory, Darren Knox, Sean Holmes, Colin Tulloch, Ken McDonald, and John Freemantle.

REFERENCES

Beamish, R.J., C. Wood, and C. Houle. 1978. A summary of sablefish tagging studies conducted during 1977 by the Pacific Biological Station. Fish. Mar. Serv. Data Rep. 77: 102 p.

Beamish, R.J., C. Houle, C. Wood, and R. Scarsbrook. 1979. A summary of sablefish tagging and exploratory trapping studies conducted during 1978 by the Pacific Biological Station. Can. Data Rep. Fish. Aquat. Sci. 162: 113 p.

Beamish, R.J., C. Houle, and R. Scarsbrook. 1980. A summary of sablefish tagging and biological studies conducted during 1979 by the Pacific Biological Station. Can. Manuscr. Rep. Fish. Aquat. Sci. 1588: 194 p.

Beamish, R.J., G.A. McFarlane, R. Scarsbrook, D. Chilton, I. Barber, K. Best, A. Cass, and W. Shaw. 1983. A summary of sablefish tagging and biological studies conducted during 1980 and 1981 by the Pacific Biological Station. Can. Manuscr. Rep. Fish. Aquat. Sci. 1732: 135 p.

Downes, A.J., Andrews, W.T., Smith, M.S., Saunders, M.W., and G.D. Jewsbury. 1997. Cruise details of sablefish (*Anoplopoma fimbria*) surveys conducted in B.C. waters, 1994-1995. Can. Data. Rep. Fish. Aquat. Sci. 1007: 106 p.

Haist, V., R. Hilborn, and M. Wyeth. 2001. Sablefish stock assessment for 2001 and advice to managers for 2002. Can. Sci. Advisory Res. Doc. 2001/135. 54 p.

Kronlund, A.R., Haist, V., Malcolm Wyeth, and R. Hilborn. 2003. Sablefish (Anoplopoma fimbria) in British Columbia, Canada: stock assessment for 2002 and advice to managers for 2003. Can. Sci. Advisory Res. Doc. *In press.*

McFarlane, G.A., and R. J. Beamish. 1983a. Overview of the fishery and management strategy for sablefish (*Anoplopoma fimbria*) off the west coast of Canada. p.13-35. *In* Proceedings of the Second Lowell Wakefield Fisheries Symposium, Anchorage, AK, Alaska Sea Grant Report 83-3.

McFarlane, G.A., and R. J. Beamish. 1983b. Biology of adult sablefish (*Anoplopoma fimbria*) in waters off western Canada. p. 59-80. *In* Proceedings of the Second Lowell Wakefield Fisheries Symposium, Anchorage, AK, Alaska Sea Grant Report 83-3.

Murie, D.J., W. Mitton, M.W. Saunders and G.A. McFarlane. 1995. A summary of sablefish tagging and biological studies conducted during 1982-87 by the Pacific Biological Station. Can. Data Rep. Fish. Aquat. Sci. 959: 84 p.

Smith, M.S., Saunders, M.W. and W.T. Andrews. 1996. Cruise details of sablefish (*Anoplopoma fimbria*) surveys conducted in B.C. waters 1988-1993. Can. Data Rep. Fish. Aquat. Sci. 976: 129 p.

Wyeth, M.R., and A.R. Kronlund 2003. Sablefish (Anoplopoma fimbria) Research and Assessment Surveys conducted in British Columbia waters from 1996 through 2000. Can. Data Rep. Fish. Aquat. Sci. 1116: 130 p.

Table 1. Sablefish Research and Assessment surveys conducted from 1988 to 2001.

Year	Vessel	Skipper	Dates	Sets	GFBio Trip ID
1988	F/V Vicious Fisher	Vance Fletcher	28 Oct - 24 Nov	16	43990
1989	F/V La Porsche	Sigurd Brynjolfson	19 Oct - 18 Nov	29	43910
1990	F/V Viking Star	Doug Farrington	08 Nov - 18 Nov	24	43750
1991	R/V W. E. Ricker	Alan Farrington	09 Oct - 29 Oct	32	43673
1992	R/V W. E. Ricker	Ron Roberts	13 Oct - 04 Nov	38	43670
1993	R/V W. E. Ricker	Alan Farrington	19 Oct - 11 Nov	42	43650
1994	F/V La Porsche	Richard Beauvais	13 Oct - 31 Oct	39	43630
	F/V Western Viking	Rick Jones	18 Oct - 13 Nov	27	43390
1995	F/V Ocean Pearl	Robert Fraumeni	08 Oct - 20 Oct	29	43270
	F/V Victor F	Michael Derry	11 Oct - 28 Oct	34	43330
	F/V Viking Sunrise	Jason Olsen	01 Oct - 31 Oct	40	43350
1996	F/V Viking Sunrise	Albert Melnychuck	10 May - 30 May	42	43024
	F/V Ocean Pearl	Michael Derry	26 Sept - 10 Oct	32	43039
	F/V Viking Star	Otto Elvan	30 Sept - 22 Oct	49	43210
1997	F/V Viking Sunrise	Albert Melnychuck	20 May - 10 Jun	42	42760
	F/V Ocean Pearl	Michael Derry	26 Sept - 21 Oct	74	42699
1998	F/V Ocean Pearl	Michael Derry	22 Sept - 17 Oct	89	41122
1999	F/V Ocean Pearl	Michael Derry	29 Sept - 30 Oct	109	40589
2000	F/V Pacific Viking	Albert Melnychuck	08 Oct - 14 Nov	131	40517
2001	F/V Ocean Pearl	Michael Derry	06 Oct - 06 Nov	134	43233

Table 2. Localities visited during sablefish research and assessment surveys from 1990 through 2001 showing the number of indexing (I) and tagging (T) sets completed at each locality. Surveys conducted in 1988 and 1989 are not shown as the fishing protocols were not consistent with the 1990-2001 time series.

	Year	1990	1991	1992	1993	1994		1995		1996			1997			1998		1999		2000		2001	
	Survey	fall	fall	fall	fall	fall		fall		spring	fall		spring	fall		fall		fall		fall		fall	
	Set Type	I	I	I	I	I	T	I	T	T	I	T	T	I	T	I	T	I	T	I	T	I	T
Offshore Indexing Locality	Langara Island-North Frederick	-	4	5	4	5	-	5	-	3	5	-	3	5	-	5	-	6	1	8	1	5	1
	Louis Point-Frederick Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
	Kunakun Point	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
	Hippa Island	-	-	4	5	5	-	5	-	-	5	-	-	-	-	5	-	6	1	8	1	5	1
	Buck Point	-	4	5	5	5	-	5	-	3	5	-	3	5	-	5	-	6	1	5	1	5	1
	Tasu Sound-Marble Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	6	-
	Gowgaia Bay	-	4	4	5	5	-	5	5	3	5	-	3	5	-	5	-	6	1	8	1	8	1
	Flamingo Inlet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-
	Cape St. James	-	-	-	-	5	-	5	-	3	5	-	3	5	-	5	-	5	1	5	1	5	1
	Triangle Island	-	4	5	4	5	-	5	-	3	5	-	3	5	-	5	-	5	1	5	1	5	1
	Quatsino Sound	8	8	5	5	5	-	5	-	3	5	-	3	5	-	5	-	5	1	8	1	8	1
	Solander Island	-	-	-	-	5	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Esperanza Inlet	8	-	5	5	5	-	5	-	3	5	-	3	5	-	5	-	5	1	8	1	8	1
	Barkley Canyon	8	8	5	9	5	-	5	-	3	5	-	3	5	-	5	-	5	1	8	1	8	1
	Total	**24**	**32**	**38**	**42**	**50**	**-**	**50**	**5**	**24**	**45**	**-**	**24**	**40**	**-**	**45**	**-**	**49**	**9**	**72**	**9**	**72**	**9**
Mainland Inlet Locality	Portland Inlet	-	-	-	-	5	-	5	-	-	5	-	-	5	-	5	-	5	-	5	-	5	-
	Gil Island	-	-	-	-	5	-	5	-	-	5	-	-	5	-	5	-	5	-	5	-	5	-
	Finlayson Channel	-	-	-	-	-	1	3	-	-	4	-	-	5	-	5	-	5	-	5	-	5	-
	Mathieson Channel	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
	Dean/Burke Channel	-	-	-	-	-	-	5	-	-	5	-	-	5	-	5	-	5	-	5	-	5	-
	Total	**-**	**-**	**-**	**-**	**10**	**2**	**18**	**-**	**-**	**20**	**-**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**	**20**	**-**

	Year	1990	1991	1992	1993	1994		1995		1996			1997			1998		1999		2000		2001	
	Survey	fall	fall	fall	fall	fall		fall		spring	fall		spring	fall		fall		fall		fall		fall	
	Set Type	I	I	I	I	I	T	I	T	T	I	T	T	I	T	I	T	I	T	I	T	I	T
Offshore Tagging Locality	Frederick Island	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hogback	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
	Rennell Sound	-	-	-	-	-	-	-	-	3	-	2	3	-	2	-	-	-	8	-	5	-	4
	Chads Point	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tasu Sound	-	-	-	-	-	-	-	-	3	-	2	3	-	2	-	5	-	5	-	3	-	4
	Anthony Island	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mitchell's Gully/Middle Ground	-	-	-	-	-	-	-	3	3	-	3	3	-	2	-	4	-	3	-	4	-	4
	Pisces Canyon	-	-	-	-	-	-	-	2	3	-	3	3	-	2	-	4	-	6	-	4	-	4
	Kyuquot Sound-Ouokinish Inlet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-
	Estevan Point	-	-	-	-	-	-	-	2	3	-	3	3	-	2	-	4	-	4	-	4	-	4
	Father Charles Canyon	-	-	-	-	-	-	-	2	3	-	3	3	-	2	-	3	-	4	-	4	-	4
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**27**	**18**	**-**	**16**	**18**	**-**	**14**	**-**	**24**	**-**	**30**	**-**	**24**	**-**	**24**
	Grand Total	**24**	**32**	**38**	**42**	**60**	**2**	**68**	**22**	**42**	**65**	**16**	**42**	**60**	**14**	**65**	**24**	**69**	**37**	**92**	**33**	**92**	**33**

Table 3. Sablefish research and assessment survey depth strata.

Stratum	Minimum depth m (fm)	Maximum depth m (fm)
Standard Indexing		
1	275 (150)	457 (250)
2	457 (250)	641 (350)
3	641 (350)	824 (450)
4	824 (450)	1006 (550)
5	1006 (550)	Deeper
West Coast of Vancouver Island Deepwater		
	1188 (650)	1280 (700)
	1280 (700)	1463 (800)
	1463 (800)	Deeper
Queen Charlotte Island Deepwater		
	1188 (600)	1463 (800)
Mainland Inlet Indexing		
	prevailing depths at set locations	
Tagging		
	457 (250)	824 (450)

Table 4. Escape-ring study localities and target depth ranges.

Area Locality	Minimum Depth m (fm)	Maximum Depth m (fm)	Area Code (Major-Minor-Locality)
West Coast Queen Charlotte Islands			
Tian Head	347 (190)	530 (290)	09-31-04
Rennell Sound	274 (150)	457 (250)	09-31-01
Flamingo Inlet	604 (330)	786 (430)	09-34-05
Queen Charlotte Sound			
Cape St. James	293 (160)	475 (260)	06-08-06
South Triangle Islands	347 (190)	475 (260)	05-11-10
South Scott Islands	421 (230)	603 (330)	05-11-06
West Coast Vancouver Island			
North Esperanza Canyon	475 (260)	658 (360)	04-26-08
North Esperanza Canyon	402 (220)	585 (320)	04-26-08
Barkley Canyon	256 (140)	439 (240)	03-23-10

Table 5. Summary of species captured during the 2001 Sablefish Research and Assessment Survey.

Common Name	Scientific Name	Total Count	Total Weight (kg)
Round fish			
Sablefish	*Anoplopoma fimbria*	24,008	56,845
Roughscale rattail	*Coryphaenoides acrolepis*	458	391
Pectoral rattail	*Albatrossia pectoralis*	202	793
Spiny dogfish	*Squalus acanthias*	27	21
Pacific flatnose	*Antimora microlepis*	16	13
Pacific sleeper shark	*Somniosus pacificus*	8	348
Lingcod	*Ophiodon elongatus*	5	42
Pacific cod	*Gadus macrocephalus*	4	6
Grenadiers	*Macrouridae*	1	1
Twoline eelpout	*Bothrocara brunneum*	1	1
Rockfish			
Rougheye rockfish	*Sebastes aleutianus*	552	918
Redbanded rockfish	*Sebastes babcocki*	63	91
Shortspine thornyhead	*Sebastolobus alascanus*	16	12
Longspine thornyhead	*Sebastolobus altivelis*	7	1
Thornyheads	*Sebastolobinae*	3	1
Rosethorn rockfish	*Sebastes helvomaculatus*	3	1
Shortraker rockfish	*Sebastes borealis*	2	7
Pacific ocean perch	*Sebastes alutus*	1	not weighed
Yelloweye rockfish	*Sebastes ruberrimus*	1	6
Aurora rockfish	*Sebastes aurora*	1	1
Yellowtail rockfish	*Sebastes flavidus*	1	not weighed
Darkblotched rockfish	*Sebastes crameri*	1	not weighed
Flatfish			
Arrowtooth flounder	*Atheresthes stomias*	309	644
Dover sole	*Microstomus pacificus*	56	76
Pacific halibut	*Hippoglossus stenolepis*	50	358
Deepsea sole	*Embassichthys bathybius*	2	2

Table 5 (cont'd)

Common Name	Scientific Name	Total Count	Total Weight (kg)
Invertebrates			
Sea urchins	Echinacea	494	3
Gastropods	Gastropoda	169	1
Tanner crabs	*Chionoecetes sp.*	139	70
Starfish	Asteriodea	130	not weighed
Lithodes couesi	*Lithodes couesi*	55	21
Ophiuroidea	Ophiuroidea	22	0
Paralomis multispina	*Paralomis multispina*	17	9
Echinoidea	Echinoidea	7	not weighed
True crabs	Bracyura	6	3
Sea lilies and feather stars	Crinodea	4	not weighed
Sponges	Porifera	3	not weighed
Sea cucumber	Holothuroidea	3	not weighed
Lithodes	Lithodes	3	3
Jellyfish	Scyphozoa	3	not weighed
Anemone	Actiniaria	3	not weighed
Box crabs	Lopholithodes	1	1
Basket stars	Euryalae	1	not weighed
Octopus	Octopoda	1	1

Table 6. Summary of sablefish recovered, tagged and sampled during the 2001 survey. Fish sampled during escape-ring study sets are not included. The mean fork lengths and proportion of males refer to the sampled fish only, and does not include recovered tagged fish or tag releases.

	Number of Sablefish					Mean Fork Length (mm)		Proportion
Locality	**Recovered**	**Tagged**	**LSMO**	**Stomach**	**Total**	**Male**	**Female**	**Males**
Langara Island-North Frederick	0	141	27	27	168	624	687	0.63
Louis Point-Frederick Island	0	0	7	7	7	630	682	0.43
Kunakun Point	0	0	5	5	5	659	772	0.40
Hippa Island	0	270	49	49	319	602	685	0.35
Buck Point	10	557	46	46	613	617	682	0.70
Tasu Sound-Marble Island	1	0	136	21	137	699	783	0.23
Gowgaia Bay	2	86	66	56	154	638	710	0.36
Flamingo Inlet	0	0	24	24	24	695	755	0.33
Cape St. James	26	552	92	45	670	609	651	0.66
Triangle Island	8	497	81	48	586	610	692	0.54
Quatsino Sound	3	659	268	128	930	571	671	0.51
Esperanza Inlet	4	348	193	118	545	577	664	0.41
Barkley Canyon	6	892	278	49	1,176	578	700	0.32
Offshore Indexing Total	**60**	**4,002**	**1,272**	**623**	**5,334**	**624**	**703**	**0.45**
Portland Inlet	19	1,251	273	126	1,543	562	611	0.14
Gil Island	41	1,301	274	94	1,616	563	604	0.27
Finlayson Channel	26	911	263	102	1,200	583	619	0.28
Dean/Burke Channel	15	632	269	152	916	546	596	0.31
Inlet Total	**101**	**4,095**	**1,079**	**474**	**5,275**	**564**	**608**	**0.25**

Table 6 (cont'd)

	Number of Sablefish					Mean Fork Length (mm)		Proportion
Locality	**Recovered**	**Tagged**	**LSMO**	**Stomach**	**Total**	**Male**	**Female**	**Males**
Rennell Sound	203	1,358	51	0	1,612	568	641	0.80
Tasu Sound	21	1,124	49	0	1,194	662	745	0.67
Middle Ground	251	2,126	51	0	2,428	570	608	0.78
Pisces Canyon	34	1,171	51	0	1,256	624	666	0.45
Estevan Point	132	2,608	70	0	2,810	590	640	0.59
Father Charles Canyon	101	1,764	47	0	1,912	566	638	0.68
Offshore Tagging Total	**742**	**10,151**	**319**	**0**	**11,212**	**597**	**656**	**0.66**
Grand Total	**903**	**18,248**	**2,670**	**1,097**	**21,821**	**446**	**492**	**0.34**

Table 7. Summary of sablefish tagged and released during surveys from 1994 to 2000 showing totals for indexing (I) and tagging (T) sets by locality and year.

	Year	1994		1995		1996			1997			1998		1999		2000		2001	
	Survey	fall		fall		spring	fall		spring	fall		fall		fall		fall		fall	
	Set Type	I	T	I	T	T	I	T	T	I	T	I	T	I	T	I	T	I	T
Offshore Indexing Locality	Langara Island-North Frederick	227	-	154	-	1,266	138	-	537	0	-	258	-	189	657	11	431	0	141
	Louis Point-Frederick Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
	Kunakun Point	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
	Hippa Island	279	-	198	-	-	325	-	-	-	-	262	-	0	380	8	358	0	270
	Buck Point	346	-	155	-	1,145	230	-	588	64	-	194	-	0	289	86	592	0	557
	Tasu Sound-Marble Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	0	-
	Gowgaia Bay	469	-	379	909	1,170	139	-	407	109	-	236	-	0	469	62	499	0	86
	Flamingo Inlet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	-
	Cape St. James	301	-	145	-	1,012	147	-	744	0	-	47	-	163	676	87	435	26	526
	Triangle Island	238	-	499	-	1,004	178	-	755	66	-	277	-	41	743	187	807	0	497
	Quatsino Sound	198	-	290	-	1,038	0	-	676	0	-	156	-	218	364	280	464	188	471
	Solander Island	200	-	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Esperanza Inlet	464	-	567	-	754	196	-	644	297	-	302	-	122	170	345	689	45	303
	Barkley Canyon	882	-	696	-	1,315	498	-	570	535	-	281	-	212	1,167	1,181	639	253	639
	Total	**3,604**	**-**	**3,363**	**909**	**8,704**	**1,851**	**-**	**4,921**	**1,071**	**-**	**2,013**	**-**	**945**	**4,915**	**2,257**	**4,914**	**512**	**3,490**
Mainland Inlet Locality	Portland Inlet	646	-	416	-	-	1,010	-	-	527	-	2,112	-	3,799	-	541	-	1,251	-
	Gil Island	1,439	-	679	-	-	1,540	-	-	1,240	-	2,296	-	3,606	-	1,792	-	1,301	-
	Finlayson Channel	-	693	672	-	-	345	-	-	662	-	1,029	-	1,356	-	327	-	911	-
	Mathieson Channel	-	656	-	-	-	81	-	-	-	-	-	-	-	-	-	-		-
	Dean/Burke Channel	-	-	1,431	-	-	918	-	-	715	-	572	-	859	-	454	-	632	
	Total	**2,085**	**1,349**	**3,198**	**-**	**-**	**3,894**	**-**	**-**	**3,144**	**-**	**6,009**	**-**	**9,620**	**-**	**3,114**	**-**	**4,095**	**-**

Table 7 (cont'd)

	Year	1994		1995		1996			1997			1998		1999		2000		2001	
	Survey	fall		fall		spring	fall		spring	fall		fall		fall		fall		fall	
	Set Type	I	T	I	T	T	I	T	T	I	T	I	T	I	T	I	T	I	T
Offshore Tagging Locality	Frederick Island	-	-	-	1,953	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hogback	-	-	-	-	-	-	-	-	-	309	-	-	-	-	-	-	-	-
	Rennell Sound	-	-	-	-	1,022	-	698	373	-	508	-	-	-	2,139	-	2,428	-	1,358
	Chads Point	-	-	-	954	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tasu Sound	-	-	-	-	1,093	-	715	536	-	487	-	2,013	-	1,664	-	1,731	-	1,124
	Anthony Island	-	-	-	1,028	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mitchell's Gully/Middle Ground	-	-	-	1,688	1,085	-	1,578	812	-	1,082	-	2,048	-	2,108	-	1,953	-	2,126
	Pisces Canyon	-	-	-	158	1,131	-	1,277	702	-	1,119	-	2,051	-	2,016	-	1,991	-	1,171
	Kyuquot Sound-Ouokinish Inlet	-	-	-	-	-	-	-	-	-	-	-	2,339	-	-	-	-	-	-
	Estevan Point	-	-	-	1,362	880	-	1,238	1,284	-	1,476	-	4,321	-	1,712	-	2,271	-	2,608
	Father Charles Canyon	-	-	-	1,296	1,224	-	945	728	-	1,087	-	1,171	-	2,294	-	2,256	-	1,764
	Total	-	-	-	8,439	6,435	-	6,451	4,435	-	6,068	-	13,943	-	11,933	-	12,630	-	10,151
	Grand Total	5,689	1,349	6,561	9,348	15,139	5,745	6,451	9,356	4,215	6,068	8,022	13,943	10,565	16,848	5,371	17,544	4,607	13,641

Table 8. Summary of sablefish sampled from escape-ring study sets during the 2001 survey.

Locality	Number Sampled	Proportion Males	Mean Fork Length (mm) Males	Females
Tian Head	198	0.55	596	634
Rennell Sound	37*	0.57	584	662
Flamingo Inlet	112	0.74	632	732
Cape St. James	69	0.63	628	682
South Triangle Island	264	0.28	628	694
South Scott Islands	180	0.38	647	722
N. Esperanza Canyon	252	0.73	597	659
Barkley Canyon	201	0.44	631	690
Total	**1,311**	**0.54**	**618**	**684**

* includes two recovered tagged sablefish

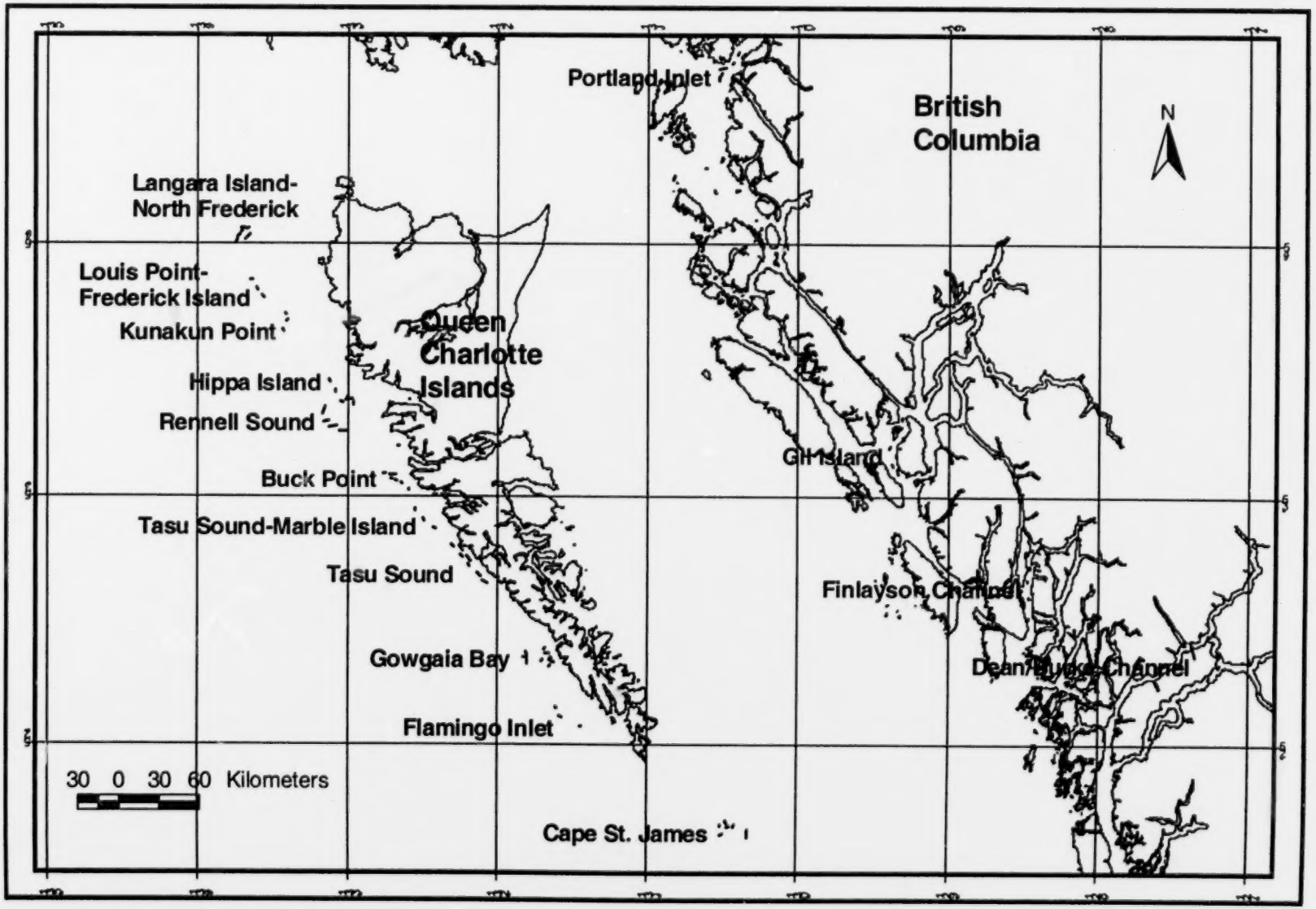


Figure 1. Locations of northern indexing and tagging sets completed during the 2001 sablefish research and assessment survey.

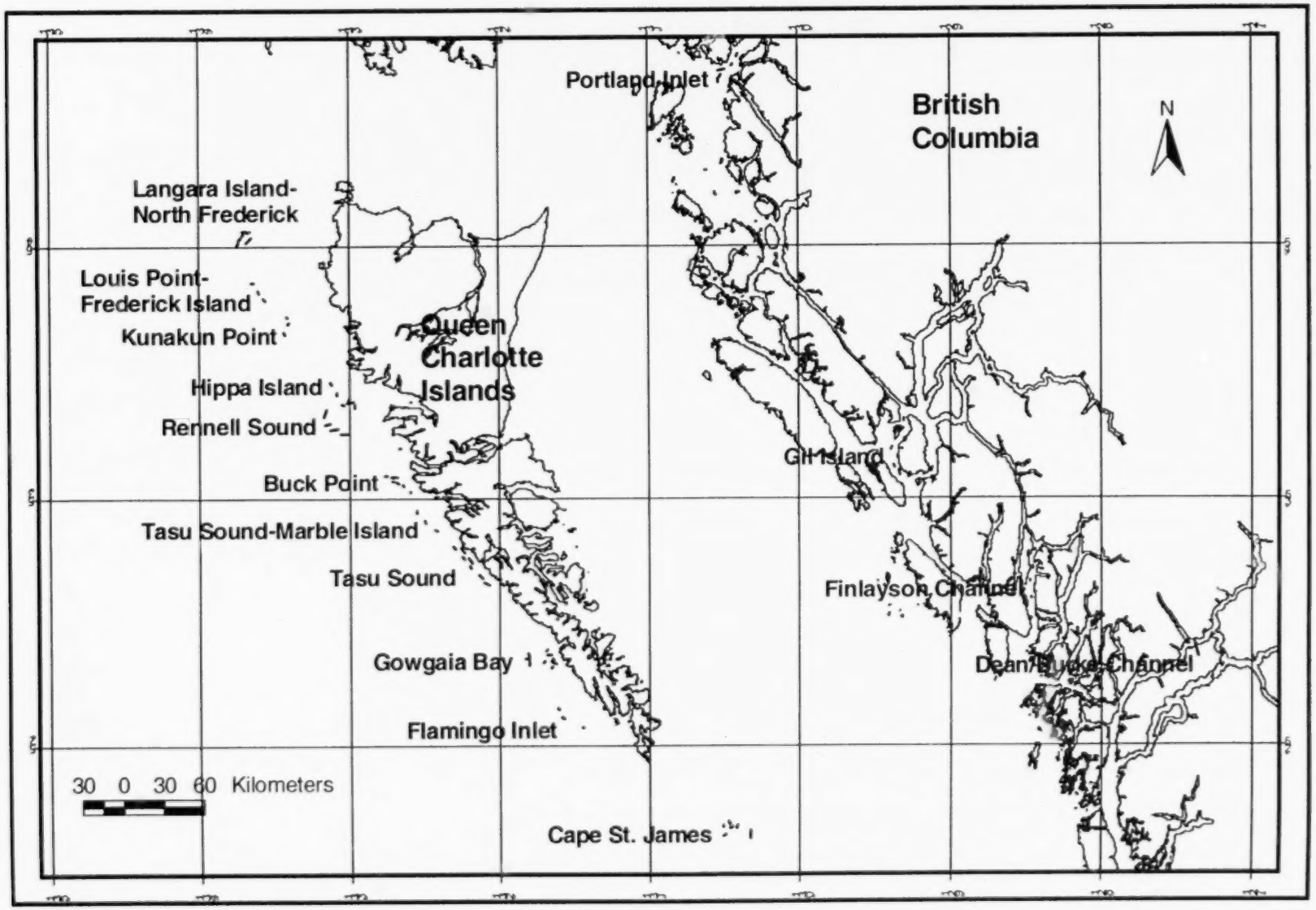


Figure 1. Locations of northern indexing and tagging sets completed during the 2001 sablefish research and assessment survey.

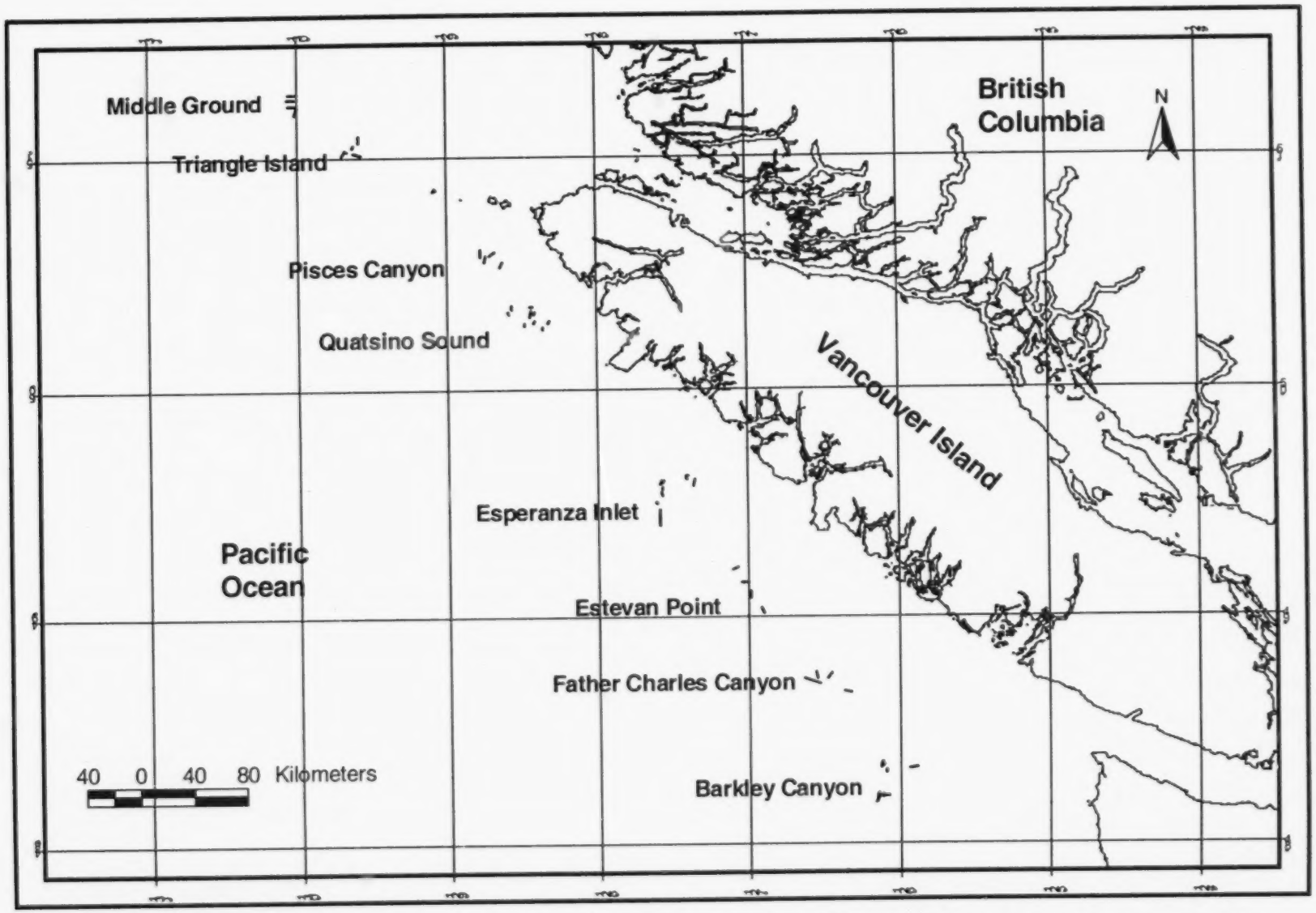


Figure 2. Locations of southern indexing and tagging sets completed during the 2001 sablefish research and assessment survey.

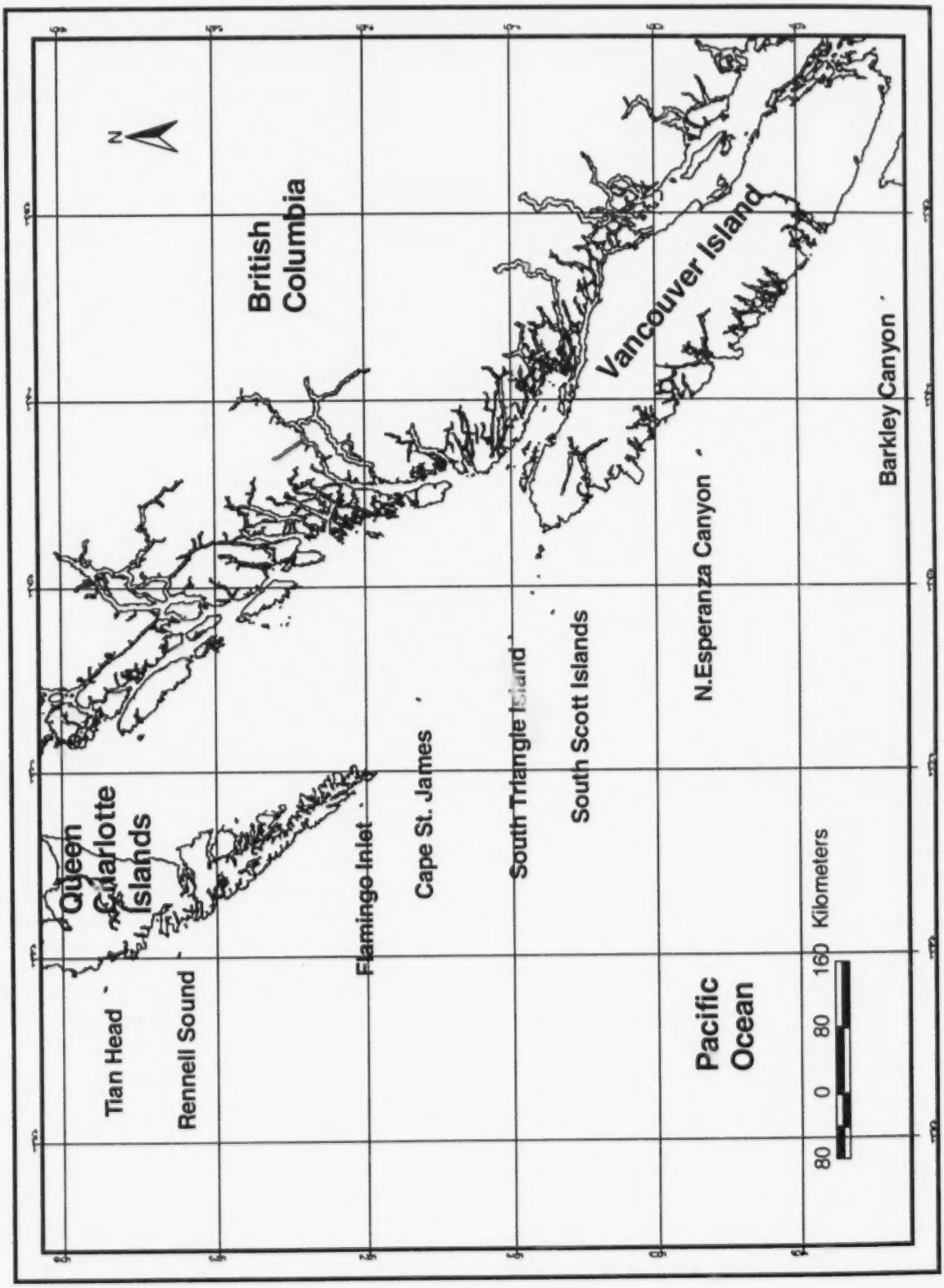


Figure 3. Locations of escape-ring study sets completed during the 2001 sablefish research and assessment survey.

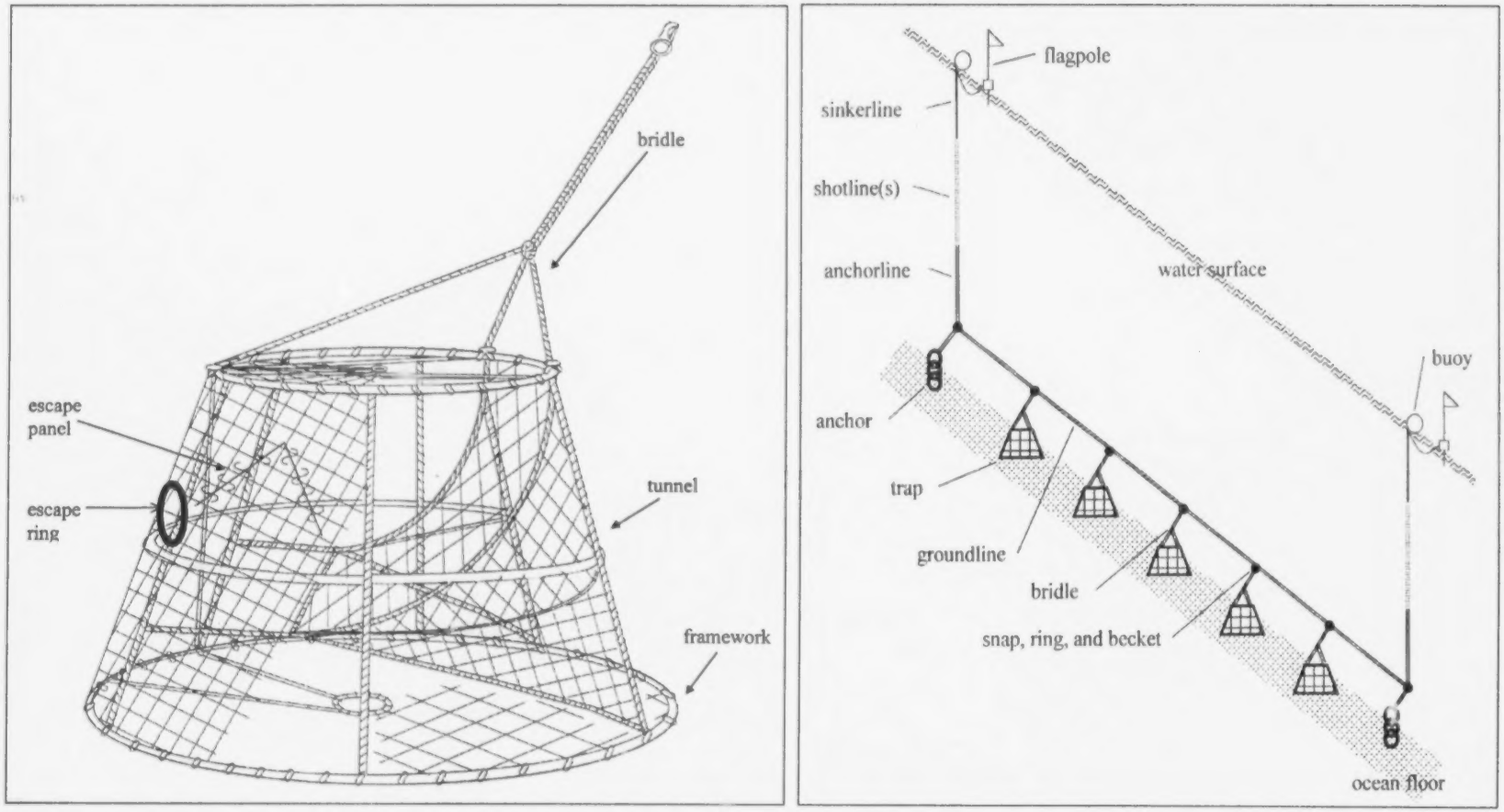


Figure 4. Diagrams of fishing gear used during sablefish research and assessment surveys. The left panel shows a modified Korean trap. The right panel shows the components of a set or string of trap gear.

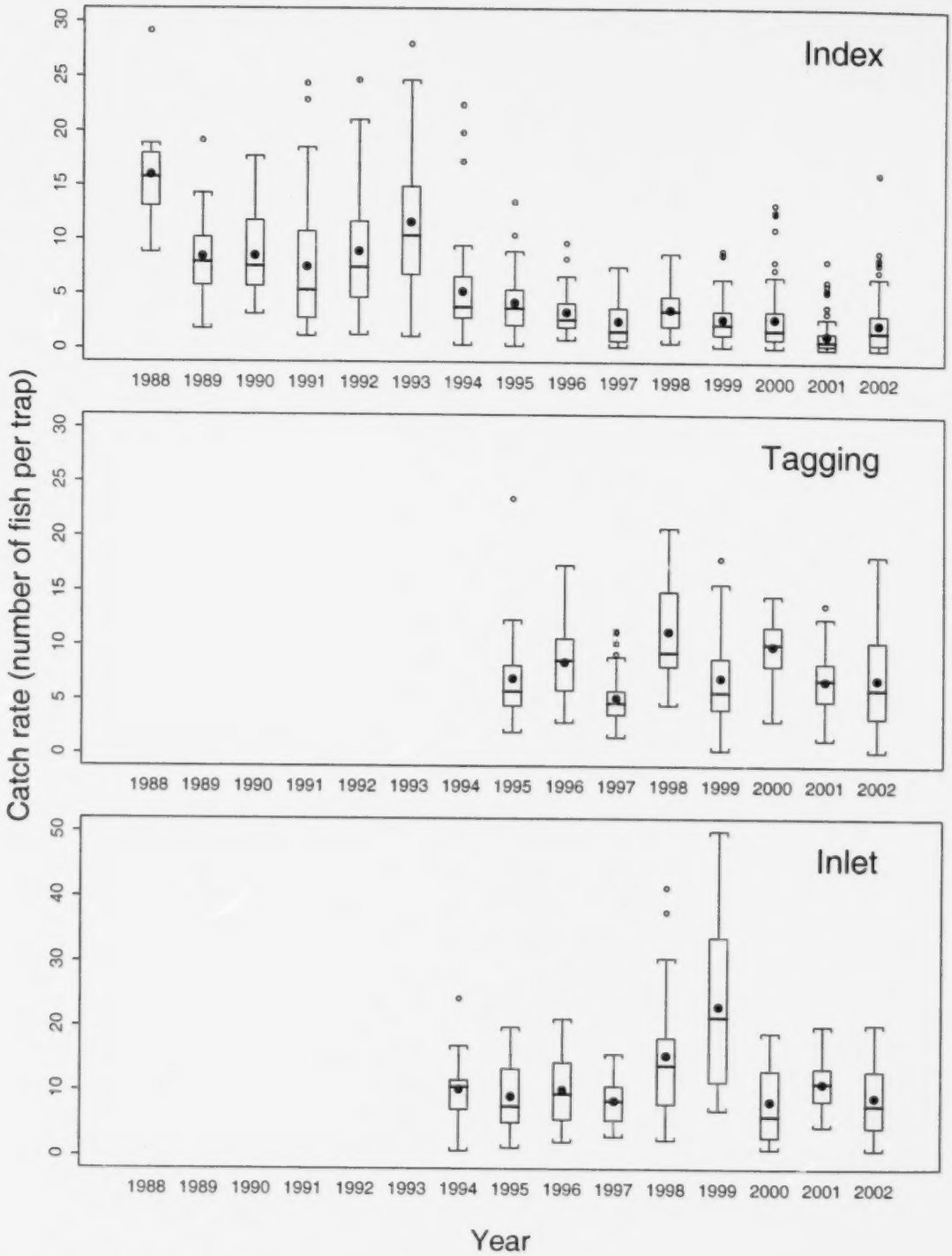


Figure 5. Distribution of catch rates for indexing, tagging, and inlet sets summarized by boxplots for each year. The filled circles show the mean annual catch rates. The shaded rectangle indicates an approximate 95 percent confidence interval on the median annual catch rate.

APPENDIX A: LIST OF 2000 SURVEY SETS TO REPEAT IN 2001

The following list of sets was supplied to the skipper in 2001 with the request to repeat as many on the list as possible. Sets marked with an asterisk (*) were the most desirable. Either an index or a tagging set could be used to repeat the sets. In other words, it was not necessary to use a 2001 tagging set to repeat a 2000 tagging set, an indexing set could be used.

		2000		Area Code	Start		End		Bottom Depth (m)		
Locality		Set #	Reason	(Maj-Min-Loc)	Latitude	Longitude	Latitude	Longitude	Start	End	Mean
Barkley Canyon	*	3	Deepwater	03-23-10	48 16.8	126 05.3	48 16.3	126 05.9	1153	1274	1190
	*	4	Indexing	03-23-10	48 17.1	126 02.7	48 16.5	126 03.2	1043	1091	1069
		5	Tagging	03-23-10	48 20.2	125 54.1	48 20.0	125 56.0	351	483	412
Father Charles Canyon		11	Tagging	03-24-06	48 45.0	126 18.1	48 43.9	126 19.5	393	468	399
		12	Tagging	03-24-06	48 45.4	126 27.4	48 44.1	126 28.3	432	553	509
		13	Tagging	03-24-06	48 43.8	126 30.0	48 42.7	126 31.5	494	613	555
Estevan Point	*	14	Tagging	04-25-01	49 00.6	126 54.3	49 02.2	126 55.0	604	531	566
	*	15	Tagging	04-25-01	49 05.1	126 59.2	49 06.6	126 59.5	641	549	590
	*	16	Tagging	04-25-01	49 09.3	127 00.3	49 09.1	127 02.8	514	576	507
Esperanza Inlet	*	21	Indexing	04-26-08	49 34.3	127 35.4	49 33.8	127 35.0	827	1007	910
		22	Tagging	04-25-04	49 36.4	127 21.1	49 35.0	127 21.7	443	512	498
Quatsino Sound		27	Tagging	04-27-06	50 20.3	128 26.5	50 19.1	128 26.9	490	842	624
	*	34	Indexing	04-27-06	50 16.0	128 22.2	50 16.2	128 21.8	824	1007	899
Pisces Canyon		37	Tagging	05-11-06	50 35.9	128 41.8	50 34.7	128 42.9	522	615	564
		38	Tagging	05-11-11	50 35.9	128 46.4	50 34.5	128 46.5	489	849	688
		39	Tagging	05-11-11	50 34.7	128 44.9	50 33.3	128 45.0	549	727	748
Triangle Island		51	Tagging	05-11-07	51 00.6	129 34.0	51 00.8	129 37.2	478	628	290
Middle Ground	*	52	Tagging	05-11-12	51 11.0	130 00.8	51 12.3	129 60.0	549	498	522
	*	53	Tagging	05-11-12	51 13.2	130 01.7	51 13.5	130 04.2	439	593	560
		54	Tagging	05-11-12	51 14.5	130 00.9	51 14.6	130 03.4	417	560	499
Cape St. James		72	Tagging	06-08-14	51 39.0	130 19.8	51 37.2	130 19.6	456	540	463
Gowgaia Bay		88	Tagging	09-34-03	52 19.8	131 37.3	52 20.1	131 39.0	458	904	688
Tasu Sound		89	Tagging	09-34-04	52 38.9	132 04.0	52 39.5	132 06.0	512	796	688
	*	90	Tagging	09-31-13	52 40.7	132 06.3	52 41.5	132 08.6	458	933	690
	*	91	Tagging	09-31-13	52 44.4	132 10.6	52 45.3	132 12.6	602	884	728
Buck Point	*	102	Tagging	09-31-03	53 05.2	132 40.7	53 05.1	132 43.3	446	847	677
Rennell Sound		104	Tagging	09-31-14	53 15.8	133 00.5	53 15.4	133 03.3	468	666	578
	*	105	Tagging	09-31-14	53 16.8	133 04.3	53 16.6	133 07.2	478	730	595
	*	106	Tagging	09-31-14	53 18.2	133 07.1	53 17.9	133 09.8	516	734	649
Langara Island- North Frederick		123	Tagging	09-35-06	54 06.9	133 42.7	54 06.4	133 45.4	468	792	622

APPENDIX B: DETAILS OF SETS COMPLETED DURING THE 2001 SURVEY.

Sets are listed sequentially by the start date. The locality name, the reason for the set (indexing, tagging, commercial fishing, etc), the start date and time, as well as the duration in minutes are shown for each set. Position data include the Groundfish Major, Minor, and Locality coding as well as the start and end latitude and longitude in degrees and decimal minutes. The bottom depth (m) at the start and end of the set are shown. The mean bottom depth is calculated from recordings at one minute intervals between the start and the end of the set. The number of traps effectively fishing is also shown and excludes traps open, holed, or fouled. Baiting practices are indicated as follows: a single asterisk (*) for approximately 1 kg of frozen squid in a bait bag or a double asterisk (**) for a combination of approximately 1 kg of frozen squid in a bait bag with 3 kg of frozen hake loose in the trap.

			Target		Start	Duration	Area Code	Start		End		Bottom Depth(m)			Traps	
Locality	Set	Reason	Strata	Date	Time	(min)	(Maj-Min-Loc)	Latitude	Longitude	Latitude	Longitude	Start	End	Mean	Fished	Bait
Barkley Canyon	1	Escape-ring		07-Oct-01	0757	2608	03-23-10	48 22.4	125 55.7	48 23.0	125 54.5	444	271	349	39	**
	2	Tagging		07-Oct-01	0859	2487	03-23-10	48 20.0	125 56.0	48 20.3	125 53.3	476	360	380	75	**
	3	Deepwater		07-Oct-01	1240	1264	03-23-0	48 10.9	126 09.4	48 11.3	126 09.3	1556	1518	1538	24	*
	4	Deepwater		07-Oct-01	1320	1324	03-23-0	48 11.9	126 09.0	48 12.2	126 08.9	1481	1247	1275	22	*
	5	Deepwater		07-Oct-01	1345	1398	03-23-0	48 12.8	126 09.2	48 13.6	126 08.8	1253	1224	1244	21	*
	6	Indexing	5	07-Oct-01	1515	1422	03-23-13	48 12.4	126 07.3	48 13.0	126 07.3	1024	1116	1068	25	*
	7	Indexing	4	07-Oct-01	1600	1483	03-23-13	48 12.6	126 08.4	48 12.8	126 04.3	1006	957	979	24	*
	8	*Indexing*	*3*	*07-Oct-01*	*1725*	*1525*	03-23-10	48 18.8	126 05.6	48 19.4	126 05.5	900	662	748	25	*
	9	Indexing	1	07-Oct-01	1805	1613	03-23-10	48 21.0	126 07.4	48 21.6	126 07.2	472	415	435	25	*
	10	Indexing	2	07-Oct-01	1839	1518	03-23-10	48 20.8	126 06.8	48 20.1	126 07.4	488	644	545	25	*
Father Charles Canyon	11	Tagging		07-Oct-01	2339	2991	03-24-6	48 45.3	126 27.3	48 44.0	126 28.6	476	545	551	68	**
	12	Tagging		08-Oct-01	0035	2982	03-24-6	48 43.8	126 38.0	48 42.4	126 31.8	488	662	560	68	**
	13	Tagging		08-Oct-01	0226	2612	03-23-12	48 40.3	126 22.3	48 40.2	126 19.4	640	454	540	68	**
	14	Tagging		09-Oct-01	0815	1212	03-24-6	48 43.7	126 33.0	48 45.7	126 33.2	594	536	576	70	**
Estevan Point	15	Tagging		09-Oct-01	1326	2124	04-25-1	49 13.4	127 04.2	49 12.8	127 06.4	373	543	465	70	**
	16	Tagging		09-Oct-01	1435	2200	04-25-1	49 09.2	127 03.0	49 09.3	127 00.2	549	472	496	70	**
	17	Tagging		09-Oct-01	1530	2272	04-25-1	49 06.9	126 59.4	49 05.3	126 59.3	541	633	585	70	**
	18	Tagging		09-Oct-01	1635	2345	04-25-1	49 02.6	126 55.2	49 01.1	126 54.1	516	565	536	70	**
N.Esperanza Canyon	19	Escape-ring		10-Oct-01	1720	2218	04-26-8	49 42.2	127 33.4	49 41.3	127 33.3	412	567	496	40	**
	20	Escape-ring		10-Oct-01	1810	2270	04-26-8	49 41.0	127 36.2	49 42.0	127 35.5	578	508	547	40	**
Esperanza Inlet	21	Tagging		10-Oct-01	2015	1410	04-25-4	49 36.5	127 21.1	49 34.7	127 21.8	463	598	518	70	**
	22	Deepwater		11-Oct-01	1402	1301	04-25-0	49 28.5	127 35.1	49 24.4	127 35.4	1686	1615	1677	22	*
	23	Deepwater		11-Oct-01	1432	1393	04-26-8	49 30.6	127 36.8	49 30.1	127 36.3	1319	1531	1379	21	*
	24	Deepwater		11-Oct-01	1516	1484	04-26-8	49 32.1	127 34.5	49 33.0	127 34.6	1295	1202	1161	24	*
	25	Indexing	5	11-Oct-01	1548	1556	04-26-8	49 33.7	127 34.3	49 34.5	127 34.5	1097	1063	1086	21	*
	26	Indexing	4	11-Oct-01	1623	1614	04-26-8	49 35.5	127 34.3	49 36.1	127 33.9	1004	792	929	23	*
	27	Indexing	3	11-Oct-01	1706	1656	04-26-8	49 35.3	127 35.1	49 36.0	127 34.6	768	655	708	26	*

APPENDIX B. (cont'd)

Locality	Set	Reason	Target Strata	Date	Start Time	Duration (min)	Area Code (Maj-Min-Loc)	Start Latitude	Start Longitude	End Latitude	End Longitude	Bottom Depth(m) Start	Bottom Depth(m) End	Bottom Depth(m) Mean	Traps Fished	Bait
	28	Indexing	2	11-Oct-01	1818	1704	04-25-4	49 36.6	127 24.2	49 37.0	127 24.9	457	525	567	21	*
	29	Indexing	1	11-Oct-01	1849	1740	04-25-4	49 37.4	127 24.0	49 37.5	127 25.1	280	412	382	25	*
Quatsino Sound	30	Indexing	3	13-Oct-01	0845	1752	04-27-6	50 18.0	128 19.3	50 17.4	128 19.4	658	786	728	25	*
	31	Indexing	4	13-Oct-01	0920	1803	04-27-6	50 16.2	128 21.8	50 15.6	128 21.9	832	918	849	25	*
	32	Indexing	5	13-Oct-01	1017	1837	04-27-6	50 17.2	128 25.1	50 18.0	128 25.1	1187	1002	1064	25	*
	33	Indexing	2	13-Oct-01	1043	1896	04-27-6	50 19.6	128 25.3	50 20.2	128 24.6	635	457	512	25	*
	34	Indexing	1	13-Oct-01	1129	1920	04-27-3	50 21.6	128 25.8	50 21.6	128 26.8	302	395	360	21	*
	35	Tagging		13-Oct-01	1203	1939	04-27-6	50 20.5	128 26.4	50 18.9	128 26.9	463	741	649	67	**
	36	Deepwater		13-Oct-01	1304	2038	04-27-6	50 16.7	128 29.0	50 17.3	128 29.2	1213	1236	1229	25	*
	37	Deepwater		13-Oct-01	1355	2198	04-27-0	50 19.8	128 35.1	50 20.3	128 35.8	1377	1330	1322	26	*
	38	Deepwater		13-Oct-01	1434	2266	04-27-0	50 21.1	128 34.3	50 21.8	128 34.0	1487	1692	1575	25	*
Pisces Canyon	39	Tagging		13-Oct-01	1652	3739	05-11-11	50 33.2	128 44.9	50 34.9	128 44.5	733	604	679	70	**
	40	Tagging		13-Oct-01	1752	3543	05-11-6	50 34.7	128 42.9	50 35.8	128 40.9	680	580	580	70	**
	41	Tagging		13-Oct-01	1936	3283	05-11-11	50 31.9	128 38.9	50 33.1	128 37.7	768	583	591	70	**
	42	Tagging		15-Oct-01	0730	1552	05-11-11	50 34.5	128 46.4	50 36.3	128 46.4	823	501	609	70	**
South Scott Islands	43	Escape-ring		15-Oct-01	1051	1679	05-11-10	50 43.3	129 17.0	50 43.8	129 18.3	622	624	527	41	**
South Triangle Island	44	Escape-ring		15-Oct-01	1350	2900	05-11-7	51 00.9	129 33.0	51 01.7	129 34.0	348	583	472	32	**
Triangle Island	45	Tagging		15-Oct-01	1503	2701	05-11-7	51 00.6	129 33.9	51 01.1	129 36.9	342	624	487	70	**
	46	Indexing	5	15-Oct-01	1625	2204	05-11-7	51 00.4	129 41.9	51 01.0	129 41.3	1134	1015	1079	27	*
	47	Indexing	4	15-Oct-01	1705	2256	05-11-7	51 01.9	129 40.6	51 01.5	129 39.7	823	969	920	25	*
	48	Indexing	3	15-Oct-01	1754	2291	05-11-7	51 02.4	129 37.5	51 03.0	129 36.8	810	662	746	23	*
	49	Indexing	2	15-Oct-01	1838	2331	05-11-7	51 03.8	129 35.3	51 04.1	129 35.1	636	499	571	23	*
	50	Indexing	1	15-Oct-01	1909	2371	05-11-7	51 05.3	129 34.8	51 04.7	129 34.9	316	439	377	25	*
Middle Ground	51	Tagging		16-Oct-01	2206	2175	05-11-12	51 10.9	130 00.8	51 12.8	129 59.7	560	450	508	70	**
	52	Tagging		16-Oct-01	2304	2242	05-11-12	51 13.1	130 00.9	51 13.2	130 03.4	485	600	530	70	**
	53	Tagging		16-Oct-01	2357	2343	05-11-12	51 14.7	130 04.1	51 14.7	130 00.9	611	413	521	70	**
	54	Tagging		17-Oct-01	0052	2468	06-08-10	51 16.2	130 00.7	51 16.2	130 03.2	369	521	448	70	**
Cape St. James	55	Escape-ring		17-Oct-01	2225	2096	06-08-14	51 39.3	130 12.8	51 38.6	130 13.7	309	532	444	36	**
	56	Tagging		17-Oct-01	2336	2154	06-08-14	51 39.0	130 19.7	51 37.3	130 19.7	424	501	479	70	**
	57	Indexing	4	18-Oct-01	0137	1347	06-08-15	51 37.8	130 30.8	51 38.1	130 29.6	907	783	949	23	*
	58	Indexing	3	18-Oct-01	0221	1569	06-08-14	51 40.8	130 28.2	51 41.4	130 28.5	849	565	728	25	*
	59	Indexing	5	18-Oct-01	0304	1418	06-08-14	51 40.5	130 30.5	51 40.0	130 30.7	1108	1205	1046	27	*
	60	Indexing	2	18-Oct-01	0404	1642	06-08-14	51 39.7	130 27.8	51 40.3	130 26.9	679	470	554	25	*
	61	Indexing	1	18-Oct-01	0435	1551	06-08-14	51 40.4	130 24.8	51 39.8	130 25.4	287	353	340	24	*
Flamingo Inlet	62	Escape-ring		19-Oct-01	2101	1692	09-34-1	52 02.2	131 21.1	52 02.9	131 22.0	594	772	697	39	**
	63	Deepwater		19-Oct-01	2224	1493	09-34-1	52 04.3	131 26.2	52 04.4	131 27.0	1097	1171	1141	25	*
	64	Deepwater		19-Oct-01	2332	1293	09-34-1	52 06.5	131 34.3	52 06.9	131 34.9	1125	1225	1202	25	*
	65	Deepwater		20-Oct-01	0010	1145	09-34-5	52 08.8	131 36.4	52 09.2	131 36.8	1105	1244	1189	25	*

APPENDIX B. (cont'd)

Locality	Set	Reason	Target Strata	Date	Start Time	Duration (min)	Area Code (Maj-Min-Loc)	Start Latitude	Start Longitude	End Latitude	End Longitude	Bottom Depth(m) Start	Bottom Depth(m) End	Bottom Depth(m) Mean	Traps Fished	Traps Bait
Gowgaia Bay	66	Indexing	4	20-Oct-01	0205	1915	09-34-3	52 18.8	131 39.4	52 19.3	131 38.6	911	860	885	25	*
	67	Tagging		20-Oct-01	0257	1721	09-34-3	52 19.8	131 37.3	52 20.4	131 39.4	437	728	578	70	**
	68	Indexing	5	20-Oct-01	0349	2413	09-34-3	52 20.4	131 41.6	52 20.2	131 42.4	988	1046	1021	26	*
	69	Indexing	1	20-Oct-01	0443	1848	09-34-3	52 20.8	131 38.4	52 21.2	131 38.9	366	362	357	25	*
	70	Indexing	3	20-Oct-01	0517	1908	09-34-3	52 21.9	131 39.4	52 21.9	131 40.7	640	733	697	26	*
	71	Indexing	2	20-Oct-01	0550	2383	09-34-3	52 22.9	131 41.4	52 23.4	131 41.0	615	395	497	24	*
	72	Deepwater		20-Oct-01	1450	1537	09-34-3	52 22.4	131 48.7	52 21.8	131 47.8	1288	1189	1227	26	*
	73	Deepwater		20-Oct-01	1527	1405	09-34-0	52 21.1	131 48.3	52 20.9	131 49.4	1123	1224	1171	24	*
	74	Deepwater		20-Oct-01	1648	1526	09-34-3	52 20.3	131 48.0	52 19.6	131 47.8	1046	1167	1189	25	*
Tasu Sound	75	Tagging		22-Oct-01	0121	2498	09-34-4	52 38.9	132 04.1	52 39.5	132 06.1	461	748	585	70	**
	76	Tagging		22-Oct-01	0204	2320	09-31-13	52 40.6	132 06.5	52 41.6	132 08.3	433	743	635	70	**
Tasu Sound-Marble Isl.	77	Deepwater		22-Oct-01	0302	2557	09-31-13	52 43.0	132 11.3	52 43.6	132 11.7	1233	1172	1211	25	*
Tasu Sound	78	Tagging		22-Oct-01	0336	2076	09-31-13	52 44.5	132 10.6	52 45.6	132 12.4	585	680	638	70	**
Tasu Sound-Marble Isl.	79	Deepwater		22-Oct-01	0429	2579	09-31-13	52 45.4	132 13.9	52 45.9	132 14.7	1134	1172	1169	21	*
Tasu Sound	80	Tagging		22-Oct-01	0508	1822	09-31-13	52 46.7	132 14.0	52 48.1	132 15.6	785	514	589	70	**
Tasu Sound-Marble Isl.	81	Deepwater		22-Oct-01	0601	1679	09-31-13	52 47.7	132 17.5	52 48.3	132 18.6	1165	1220	1160	24	*
	82	Deepwater		23-Oct-01	0645	2369	09-31-8	52 57.2	132 33.1	52 56.4	132 32.7	1074	1152	1110	25	*
	83	Deepwater		23-Oct-01	0727	2215	09-31-5	52 54.6	132 29.9	52 54.0	132 29.1	1165	1118	1118	25	*
	84	Deepwater		23-Oct-01	0813	2053	09-31-5	52 52.5	132 25.7	52 52.2	132 24.6	1363	1167	1236	24	*
Buck Point	85	Indexing	1	24-Oct-01	0339	1229	09-31-8	53 01.3	132 35.6	53 01.9	132 35.6	465	305	408	25	*
	86	Indexing	2	24-Oct-01	0425	1252	09-31-8	53 02.9	132 38.1	53 03.3	132 38.5	514	468	505	24	*
	87	Indexing	3	24-Oct-01	0502	1279	09-31-3	53 03.7	132 40.2	53 03.9	132 41.2	653	790	713	25	*
	88	Indexing	4	24-Oct-01	0542	1313	09-31-3	53 04.3	132 42.0	53 04.3	132 43.0	810	975	889	25	*
	89	Indexing	5	24-Oct-01	0625	1348	09-31-3	53 05.4	132 44.6	53 05.5	132 45.6	988	1136	1064	25	*
	90	Tagging		24-Oct-01	0713	1372	09-31-3	53 05.3	132 43.5	53 05.3	132 40.5	808	419	600	68	**
Rennell Sound	91	Escape-ring		24-Oct-01	1016	1930	09-31-14	53 15.0	132 58.9	53 14.7	132 57.0	448	337	375	40	**
	92	Tagging		24-Oct-01	1120	1895	09-31-14	53 15.6	133 03.2	53 15.7	133 00.2	633	424	530	69	**
	93	Tagging		24-Oct-01	1252	3926	09-31-14	53 16.7	133 07.2	53 16.9	133 04.3	733	459	562	70	**
	94	Tagging		25-Oct-01	1025	2747	09-31-14	53 18.1	133 07.3	53 17.9	133 09.7	534	732	642	71	**
	95	Tagging		25-Oct-01	1111	2834	09-31-14	53 19.8	133 10.1	53 21.4	133 09.1	642	466	576	70	**
Hippa Island	96	Indexing	5	25-Oct-01	1239	1859	09-31-1	53 28.0	133 07.6	53 27.4	133 07.0	1079	1017	1039	25	*
	97	Indexing	4	25-Oct-01	1312	1943	09-31-1	53 25.5	133 04.8	53 24.8	133 05.0	925	819	911	23	*
	98	Tagging		25-Oct-01	1354	2239	09-31-1	53 23.1	133 00.9	53 23.2	132 58.2	699	529	631	70	**
	99	Indexing	3	25-Oct-01	1447	1944	09-31-14	53 22.6	133 01.8	53 22.7	133 03.0	750	627	752	25	*
	100	Indexing	2	25-Oct-01	1521	2019	09-31-1	53 23.7	133 00.5	53 24.1	132 59.6	598	567	620	25	*
	101	Indexing	1	25-Oct-01	1558	2052	09-31-1	53 22.6	132 57.5	53 22.0	132 57.7	293	457	384	27	*
Kunakun Point	102	Deepwater		26-Oct-01	1422	2758	09-31-11	53 43.7	133 25.1	53 43.1	133 24.3	1132	1116	1099	25	*

APPENDIX B. (cont'd)

Locality	Set	Reason	Target Strata	Date	Start Time	Duration (min)	Area Code (Maj-Min-Loc)	Start Latitude	Start Longitude	End Latitude	End Longitude	Bottom Depth(m) Start	Bottom Depth(m) End	Bottom Depth(m) Mean	Traps Fished	Bait
Tian Head	103	Escape-ring		26-Oct-01	1500	2236	09-31-4	53 44.0	133 21.4	53 43.5	133 19.1	567	499	527	40	**
Kunakun Point	104	Deepwater		26-Oct-01	1555	2540	09-31-11	53 42.2	133 23.9	53 41.7	133 24.5	1101	1033	1070	25	*
	105	Deepwater		26-Oct-01	1633		09-31-11	53 40.0	133 26.0	53 39.4	133 25.6	1189	1196	1191	0	*
Louis Point-	106	Deepwater		27-Oct-01	1627	1445	09-31-11	53 47.3	133 33.3	53 47.8	133 34.1	1116	1160	1134	24	*
Frederick Island	107	Deepwater		27-Oct-01	1702	1527	09-31-11	53 49.2	133 35.9	53 49.8	133 36.1	1333	1289	1289	25	*
	108	Deepwater		27-Oct-01	1730	1611	09-31-2	53 51.5	133 37.7	53 51.7	133 38.7	1107	1114	1092	25	*
Langara Island-	109	Tagging		27-Oct-01	1925	2070	09-35-2	54 02.2	133 38.9	54 01.0	133 41.0	457	719	620	70	**
North Frederick	110	Indexing	5	27-Oct-01	2020	1614	09-35-6	54 00.9	133 44.0	54 00.3	133 44.7	1035	1101	1079	25	*
	111	Indexing	4	27-Oct-01	2105	1664	09-35-6	54 01.6	133 44.1	54 02.0	133 43.0	980	883	933	25	*
	112	Indexing	3	27-Oct-01	2141	1722	09-35-6	54 02.8	133 42.8	54 03.2	133 41.9	768	576	675	19	*
	113	Indexing	2	27-Oct-01	2210	1834	09-35-6	54 03.7	133 42.4	54 03.8	133 41.1	585	455	519	22	*
	114	Indexing	1	27-Oct-01	2237	1746	09-35-6	54 03.4	133 40.6	54 03.6	133 39.5	426	318	364	25	*
Portland Inlet	115	Indexing		29-Oct-01	2238	1392	08-04-12	54 44.5	130 23.8	54 43.9	130 24.4	571	562	567	22	*
	116	Indexing		29-Oct-01	2314	1255	08-04-12	54 42.2	130 25.8	54 41.8	130 26.3	554	582	571	19	*
	117	Indexing		29-Oct-01	2343	1153	08-04-10	54 40.9	130 28.8	54 40.5	130 31.7	598	633	616	24	*
	118	Indexing		30-Oct-01	0014	1055	08-04-10	54 39.6	130 30.7	54 39.2	130 31.2	636	635	642	25	*
	119	Indexing		30-Oct-01	0052	956	08-04-10	54 38.8	130 31.8	54 38.1	130 31.7	644	594	618	24	*
Gil Island	120	Indexing		31-Oct-01	2050	1241	07-06-6	53 19.1	129 18.2	53 18.5	129 18.3	536	541	538	26	*
	121	Indexing		31-Oct-01	2202	1285	07-06-6	53 12.3	129 23.1	53 11.7	129 23.8	530	529	527	25	*
	122	Indexing		31-Oct-01	2248	1321	07-06-6	53 07.8	129 22.5	53 07.3	129 22.0	558	631	591	25	*
	123	Indexing		31-Oct-01	2325	1361	07-06-6	53 06.8	129 20.6	53 05.4	129 19.8	675	655	664	23	*
	124	Indexing		01-Nov-01	0040	1407	07-06-6	53 06.4	129 07.6	53 07.2	129 07.2	543	551	562	24	*
Finlayson Channel	125	Indexing		02-Nov-01	0747	774	07-07-3	52 47.5	128 26.0	52 47.0	128 26.6	560	578	567	25	*
	126	Indexing		02-Nov-01	0837	802	07-07-3	52 43.4	128 27.4	52 42.7	128 27.4	529	477	507	24	*
	127	Indexing		02-Nov-01	0921	836	07-07-3	52 40.0	128 28.1	52 39.5	128 28.6	605	594	616	24	*
	128	Indexing		02-Nov-01	1017	861	07-07-3	52 36.0	128 28.0	52 35.4	128 28.0	693	684	719	25	*
	129	Indexing		02-Nov-01	1117	900	07-07-3	52 31.0	128 27.8	52 30.5	128 27.8	792	812	808	25	*
Dean/Burke Channel	130	Indexing		03-Nov-01	1220	713	06-08-8	52 24.8	127 22.8	52 21.5	127 21.5	518	501	510	24	*
	131	Indexing		03-Nov-01	1321	729	06-08-8	52 26.7	127 16.0	52 26.3	127 15.0	534	470	518	25	*
	132	Indexing		03-Nov-01	1416	769	06-08-8	52 22.3	127 12.4	52 21.8	127 11.6	521	538	532	21	*
	133	Indexing		03-Nov-01	1448	802	06-08-8	52 19.6	127 11.5	52 18.9	127 11.9	571	572	571	24	*
	134	Indexing		03-Nov-01	1521	853	06-08-8	52 16.5	127 15.3	52 16.0	127 16.3	582	569	580	25	*

APPENDIX C: EXAMPLE DATA FORMS

BRIDGE LOG

VESSEL: O. Pearl SET NUMBER: 2

REASON: Tagging Berkley canopy (repeat 2000 #5)

SET: Date: 2001 (yyyy) 10 (mm) 7 (dd) Time: 0859 (24 hr)

START: Lat: 48 deg. 20.03 min. Long: 125 deg. 56.03 min. 31

END: Lat: 48 deg. 20.31 min. Long: 125 deg. 53.29 min. 23

HAUL: Date: 2001 (yyyy) 10 (mm) 09 (dd) Time: 0226 (24 hr)

BOTTOM DEPTH: Start: 260 (fm) End: 197 (fm) Modal: 208 (fm)

fathoms/min: 247, 238, 232, 234, 241, 240, 240, 238, 236, 229, 230, 215, 215, 217, 218, 219, 213, 205, 209, 129, 192, 184, 192, 186, 190, 189, 194, 198, 195, 188, 196, 181, 181, 196

TARGET DEPTH: Start: 250 (fm) End: 450 (fm) Modal: _____ (fm) Strata: /

GEAR SPECIFICATIONS

TRAP: Style: Korean Colour: green/blk

Modifications: escape rings sewn over Spacing: 130 (fl) Size: 54 (in)

Number: set 75 (verified w/ crimping) lost: _____ open or fouled: _____ fishing: 75 (not verified)

confidence level: _____

TEMP SENSOR: #: / Trap #: _____

BAIT: Type 1: Squid Weight: 2 (lb) Method: bagged

Type 2: Herr Weight: 7 (lb) Method: loose

GROUNDLINE: Diameter: 1" (in) Material: Poly

TOTAL CATCH: N/A (kg) Total Catch estimation method: bycatch not examined

SPECIES CATCH

Species	weight	count	estimation method

COMMENTS: _____

Figure C.1. Example of a completed bridge log data form used during the 2001 survey.

APPENDIX C (cont'd)

Time 0944 V

CATCH LOG

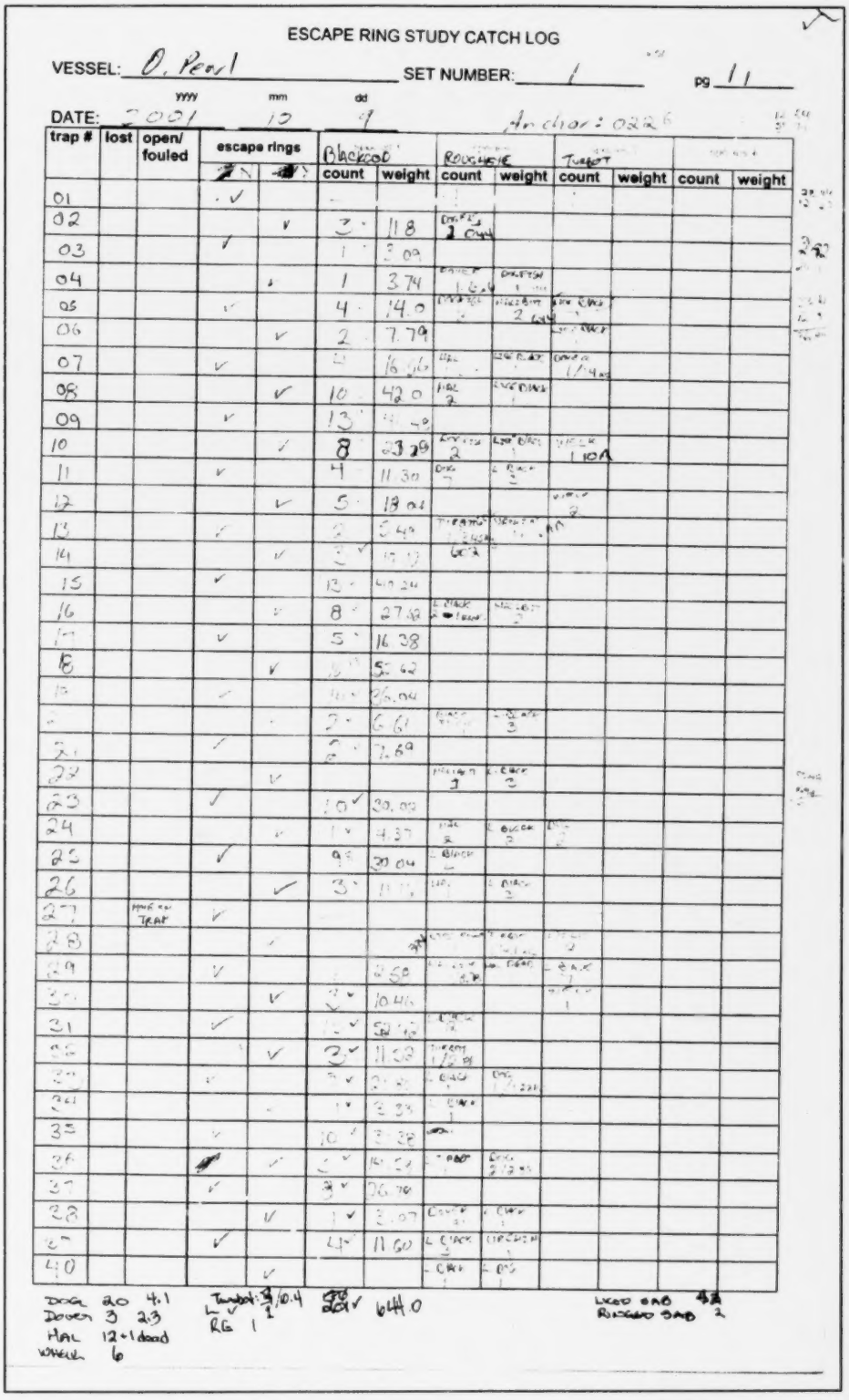
VESSEL: OCEAN PEARL SET NUMBER: 003 pg 1/1

DATE: yyyy 2001 mm 10 dd 08

trap #	lost	open/ fouled	SABLEFISH 4KG		ROUGHEYE/ BLACKGRUE 2KG				PETRALE 2.5KG		TANNER CRAB	
			count	weight	count	weight	count	weight	count	weight	count	weight
01					1	.15			1	17.96		
02			1	3.02								
03			1	4.51								
04												
05												
06												
07			1	5.75								
08			4	17.40								
09		TORN HOLE			1	2.94						
10												
11												
12												
13												
14												
15												
16												
17					1	1.01						
18					1	2.69						
19												
20												
21												
22			3	10.06	2	3.07			2	2.56		
23												
24			2	14.10					2	4.20	1	.39
25												
26		HOLE TOR	6	25.0	3	4.33			1	1.9		

Figure C.2. Example of a completed catch log form used for indexing sets during the 2001 survey.

APPENDIX C (cont'd)



ESCAPE RING STUDY CATCH LOG

VESSEL: O. Pearl SET NUMBER: 1 pg 1/1

DATE: yyyy 2001 mm 10 dd 9 Anchor: 0226

trap #	lost	open/ fouled	escape rings		Blackgod count	Blackgod weight	Rougheye count	Rougheye weight	Turbot count	Turbot weight		
											count	weight
01			✓									
02				✓	3	11.8						
03			✓		1	3.09						
04				✓	1	3.74						
05			✓		4	14.0						
06				✓	2	7.79						
07			✓		4	16.16						
08				✓	10	42.0						
09			✓		13	49						
10				✓	8	33.29						
11			✓		4	11.30						
12				✓	5	18.04						
13			✓		2	5.49						
14				✓	3	12.12						
15			✓		13	40.24						
16				✓	8	27.58						
17			✓		5	16.38						
18				✓	6	5.62						
19			✓		14	26.04						
20					2	6.61						
21			✓		2	2.69						
22				✓								
23			✓		10 ✓	30.02						
24				✓	1	4.37						
25			✓		9	30.04						
26				✓	3	11.71						
27		MISSING TRAP	✓									
28				✓								
29			✓		2	6.58						
30				✓	3	10.46						
31			✓		1	3.42						
32				✓	3	11.52						
33			✓		1	3.23						
34				✓	1	3.24						
35			✓		10	3.38						
36				✓	5	16.52						
37			✓		9	26.76						
38				✓	1	3.07						
39			✓		4	11.60						
40				✓								

DOGS 20 4.1
Dover 3 2.3
HAL 12+1 dead
WHELK 6

Turbot: 3/10.4
RG 1

SPD 2 6 4.0

LICED SAB 4
RIDGED SAB 2

Figure C.3. Example of a completed catch log form used for escape-ring study sets during the 2001 survey.

APPENDIX C (cont'd)

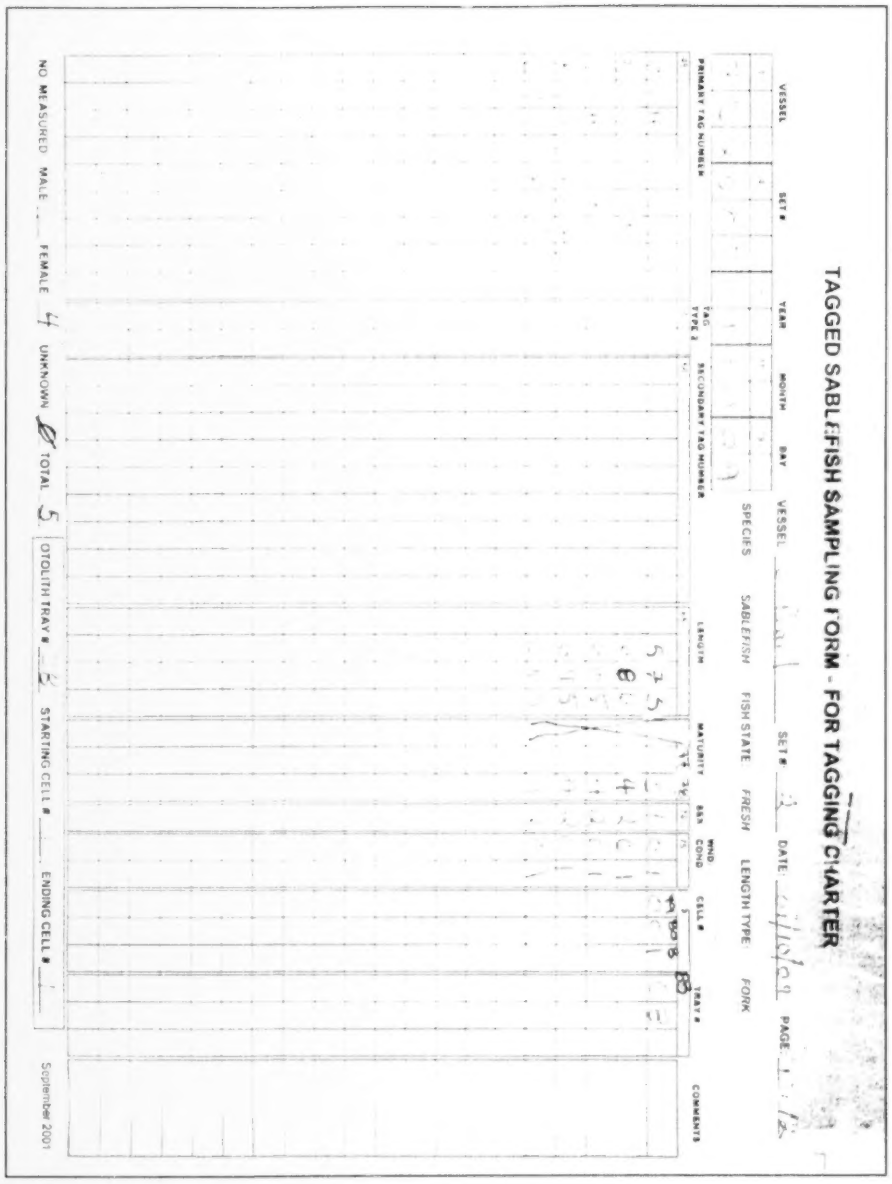


Figure C.4. Example of a completed biological sampling form used for previously tagged sablefish recovered during the 2001 survey.

APPENDIX C (cont'd)

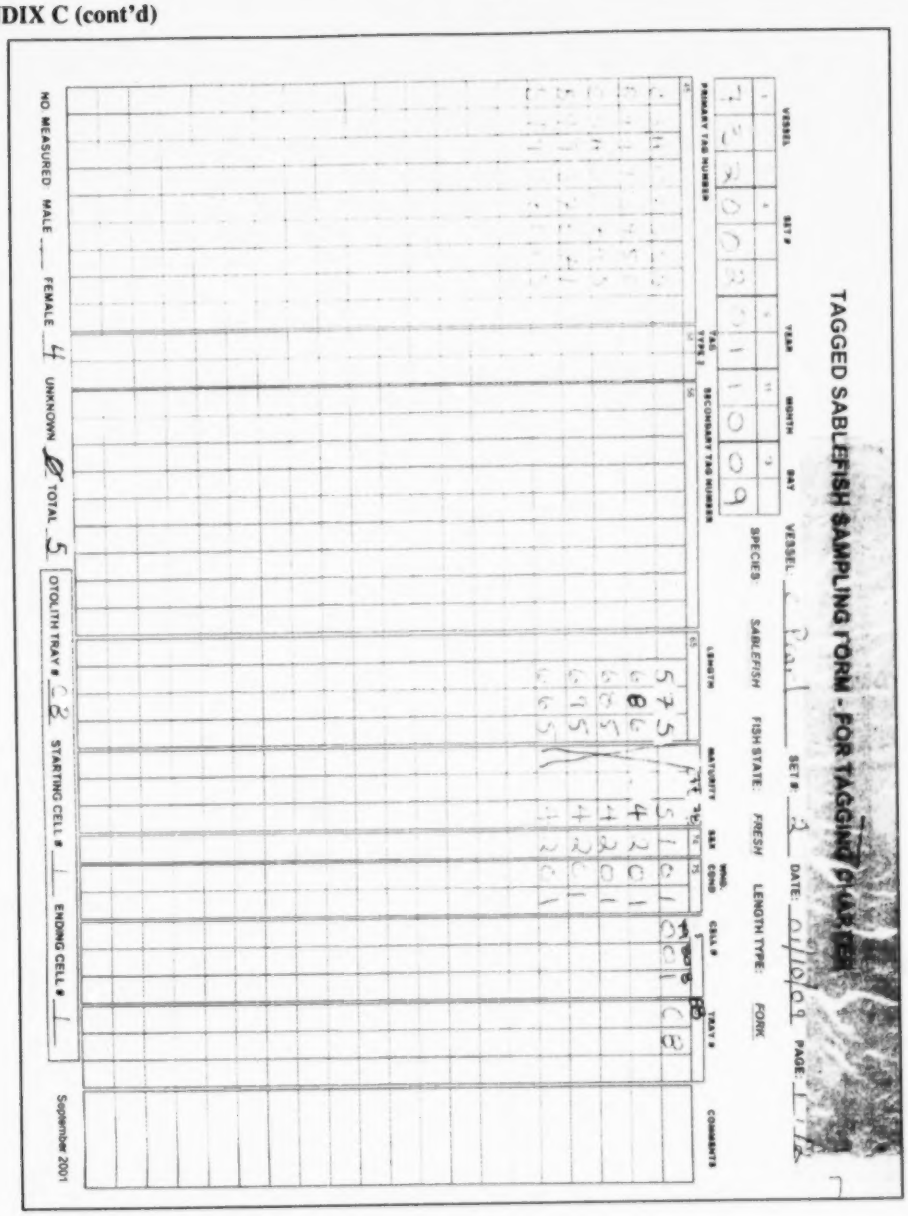
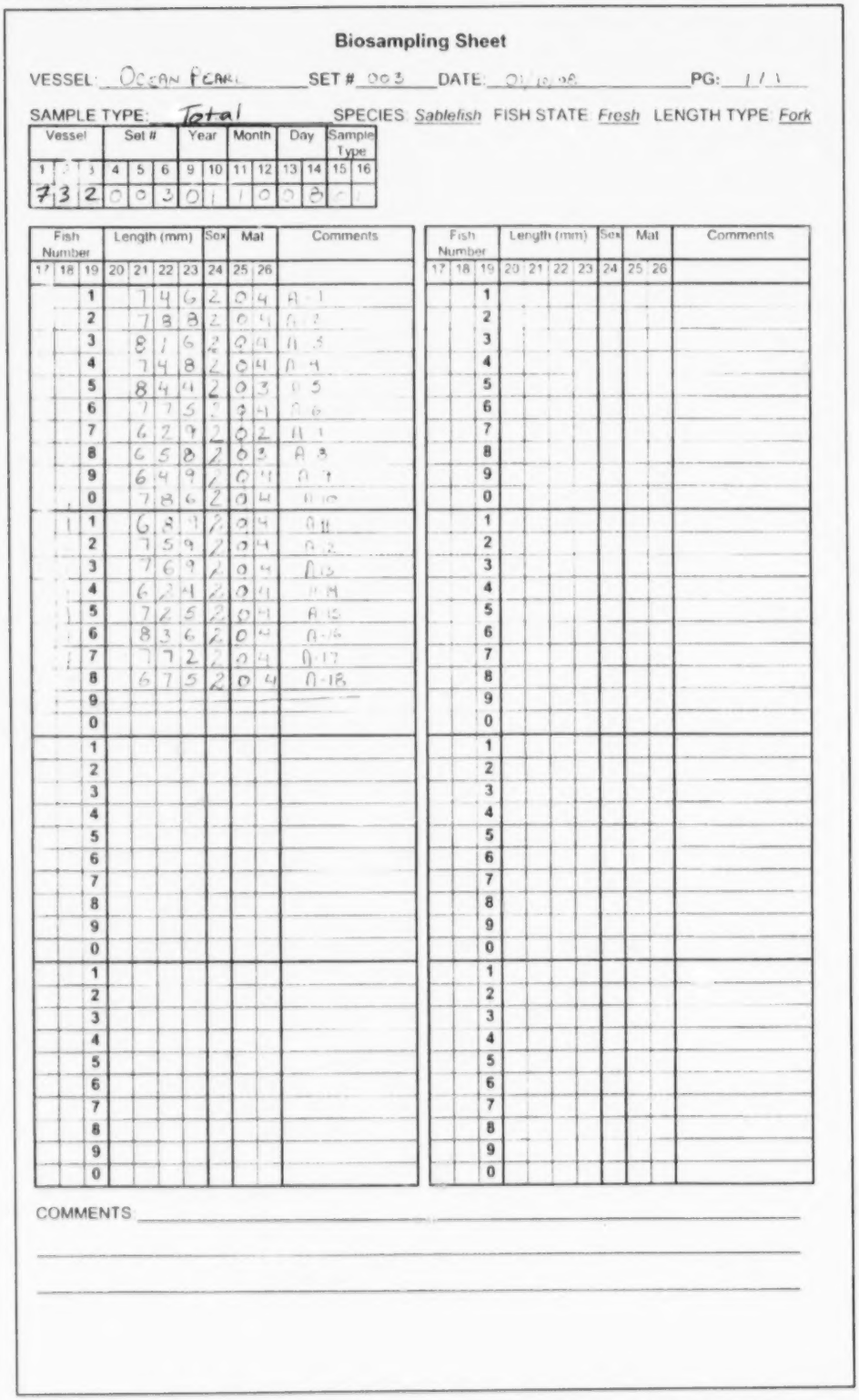


Figure C.4. Example of a completed biological sampling form used for previously tagged sablefish recovered during the 2001 survey.

APPENDIX C (cont'd)



Biosampling Sheet

VESSEL: Ocean Pearl SET # 003 DATE: 01/10/08 PG: 1 / 1

SAMPLE TYPE: Total SPECIES: Sablefish FISH STATE: Fresh LENGTH TYPE: Fork

Vessel			Set #			Year		Month		Day		Sample Type	
1	2	3	4	5	6	9	10	11	12	13	14	15	16
7	3	2	0	0	3	0	1	1	0	0	8		

Fish Number			Length (mm)				Sex	Mat		Comments
17	18	19	20	21	22	23	24	25	26	
		1		7	4	6	2	0	4	A-1
		2		7	8	3	2	0	4	A-2
		3		8	1	6	2	0	4	A-3
		4		7	4	8	2	0	4	A-4
		5		8	4	4	2	0	3	A-5
		6		7	7	5	2	0	4	A-6
		7		6	2	9	2	0	2	A-7
		8		6	5	8	2	0	3	A-8
		9		6	4	9	2	0	4	A-9
		0		7	8	6	2	0	4	A-10
	1	1		6	8	3	2	0	4	A-11
	1	2		7	5	9	2	0	4	A-12
	1	3		7	6	9	2	0	4	A-13
	1	4		6	2	4	2	0	4	A-14
	1	5		7	2	5	2	0	4	A-15
	1	6		8	3	6	2	0	4	A-16
	1	7		7	7	2	2	0	4	A-17
	1	8		6	7	5	2	0	4	A-18
	1	9								
	1	0								
	2	1								
	2	2								
	2	3								
	2	4								
	2	5								
	2	6								
	2	7								
	2	8								
	2	9								
	2	0								
	3	1								
	3	2								
	3	3								
	3	4								
	3	5								
	3	6								
	3	7								
	3	8								
	3	9								
	3	0								

Fish Number			Length (mm)				Sex	Mat		Comments
17	18	19	20	21	22	23	24	25	26	
		1								
		2								
		3								
		4								
		5								
		6								
		7								
		8								
		9								
		0								
	1	1								
	1	2								
	1	3								
	1	4								
	1	5								
	1	6								
	1	7								
	1	8								
	1	9								
	1	0								
	2	1								
	2	2								
	2	3								
	2	4								
	2	5								
	2	6								
	2	7								
	2	8								
	2	9								
	2	0								
	3	1								
	3	2								
	3	3								
	3	4								
	3	5								
	3	6								
	3	7								
	3	8								
	3	9								
	3	0								

COMMENTS: _____

Figure C.5. Example of a completed biological sampling form used for LSMO (see section 2.6.2) samples during the 2001 survey.

APPENDIX C (cont'd)

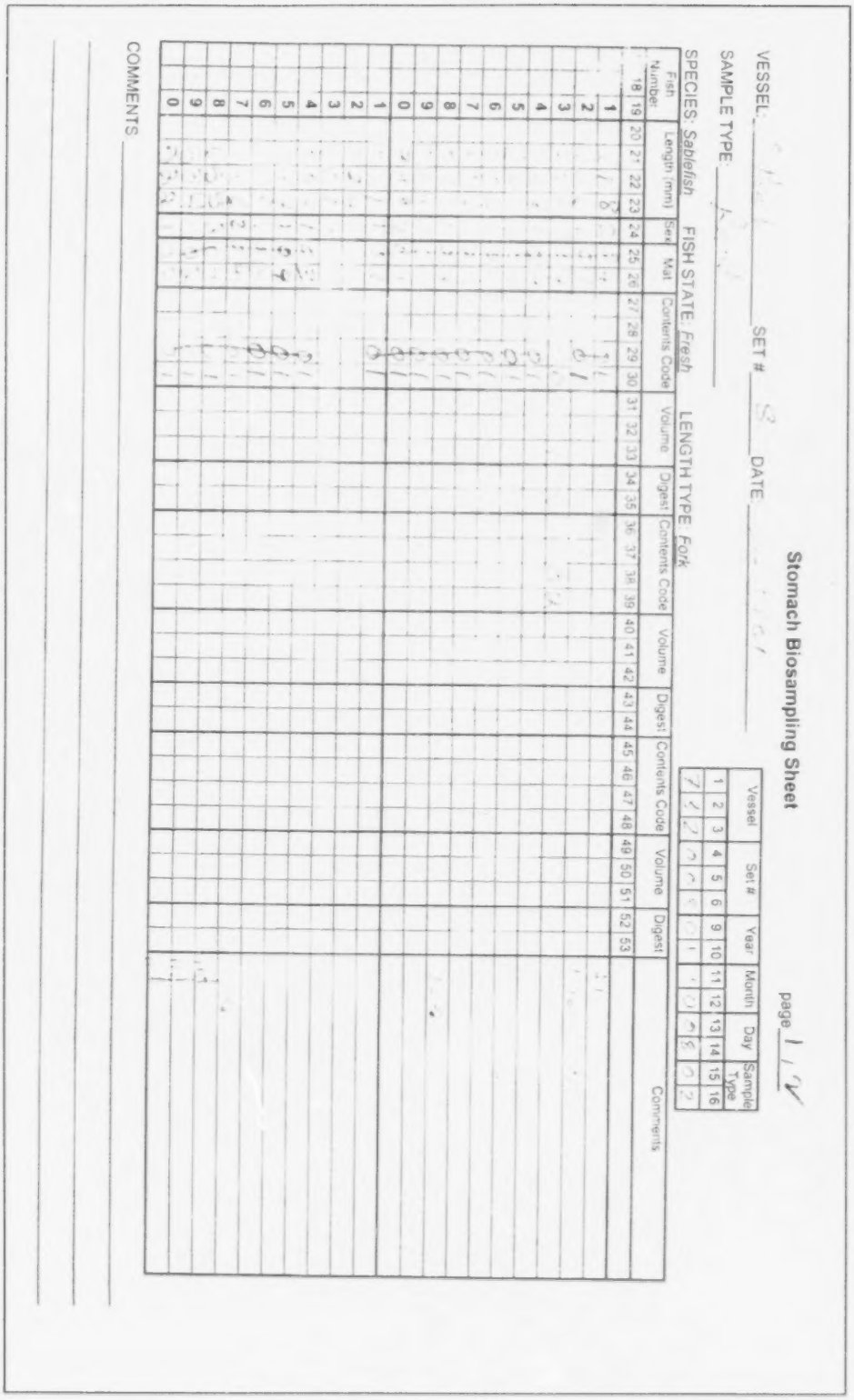
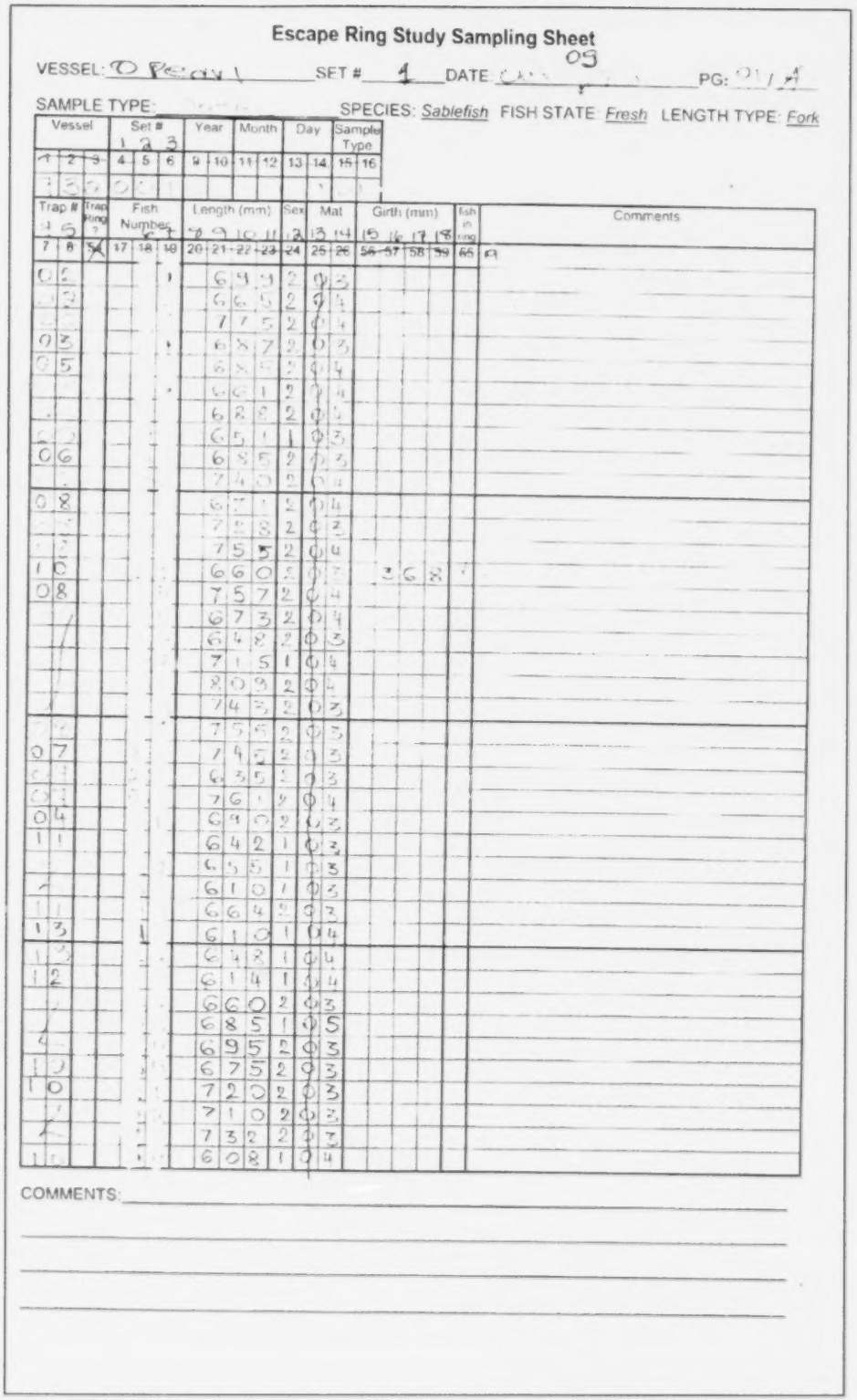


Figure C.6. Example of a completed biological sampling form used for LSMO and stomach contents samples (see section 2.6.2) during the 2001 survey.

APPENDIX C (cont'd)



Escape Ring Study Sampling Sheet

VESSEL: O Pecan I SET # 1 DATE: [illegible] 09 PG: 01 / 01

SAMPLE TYPE: SPECIES: *Sablefish* FISH STATE: *Fresh* LENGTH TYPE: *Fork*

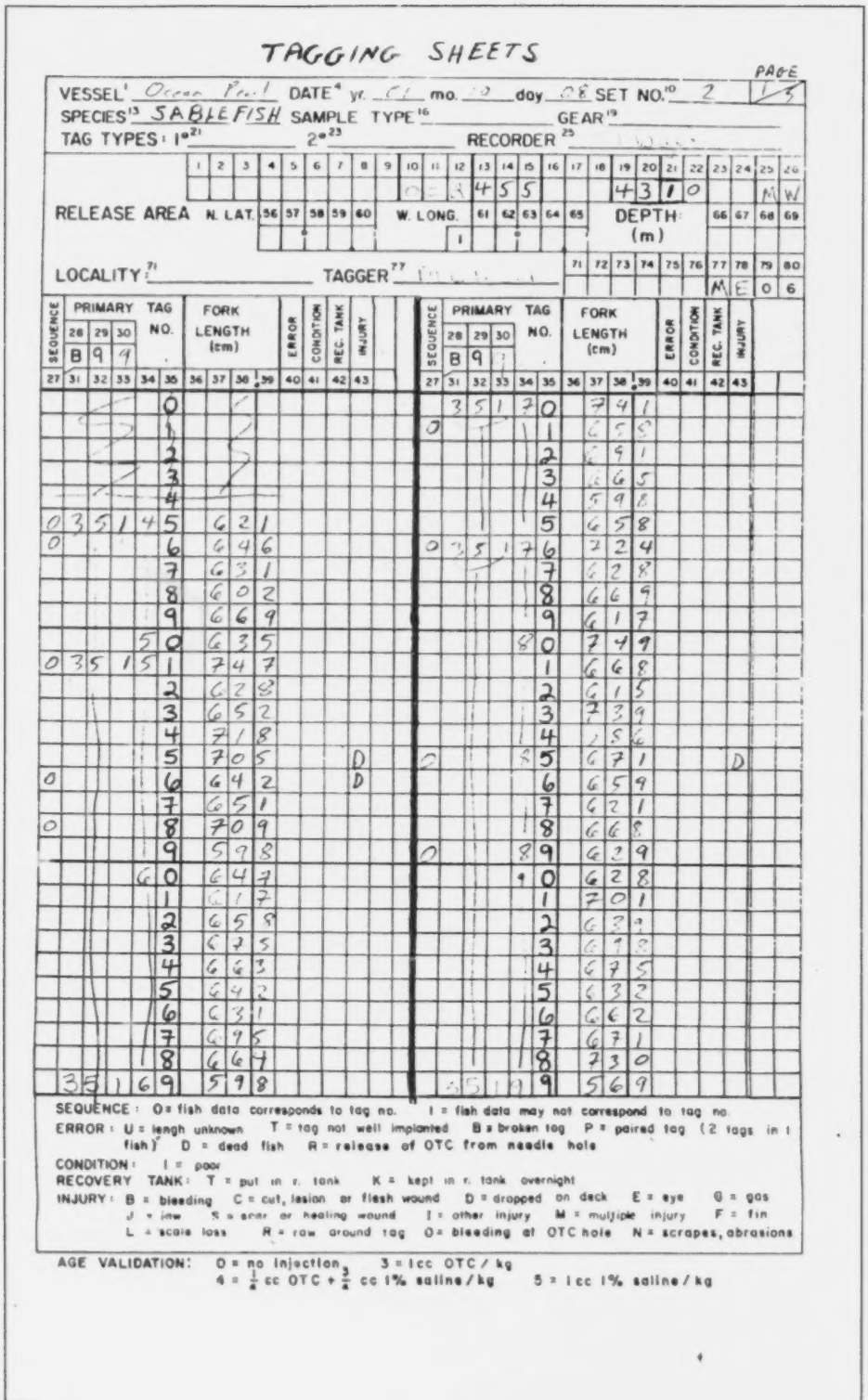
Vessel			Set #			Year		Month		Day		Sample Type	
1	2	3	4	5	6	9	10	11	12	13	14	15	16

Trap #		Trap Ring	Fish Number			Length (mm)			Sex	Mat		Girth (mm)				fish in ring	Comments
7	8	9	17	18	19	20	21	22	24	25	26	56	57	58	59	65	
0	2					6	9	3	2	0	3						
	2					6	6	5	2	0	4						
						7	1	5	2	0	4						
0	3					6	8	7	2	0	3						
0	5					6	8	[illegible]	2	0	4						
						6	6	1	2	0	4						
						6	8	8	2	0	4						
						6	5	1	1	0	3						
0	6					6	8	5	2	0	3						
						7	4	0	2	0	4						
0	8					6	7	1	2	0	4						
						7	2	8	2	0	3						
						7	5	5	2	0	4						
1	0					6	6	0	2	0	3	3	6	8			
0	8					7	5	7	2	0	4						
						6	7	3	2	0	4						
						6	4	8	2	0	3						
						7	1	5	1	0	4						
						8	0	3	2	0	4						
						7	4	3	2	0	3						
						7	5	5	2	0	3						
0	7					7	4	5	2	0	3						
						6	3	5	1	0	3						
						7	6	1	2	0	4						
0	4					6	9	0	2	0	3						
1	1					6	4	2	1	0	3						
						6	5	5	1	0	3						
2						6	1	0	1	0	3						
1	1					6	6	4	2	0	3						
1	3					6	1	0	1	0	4						
1	2					6	4	8	1	0	4						
1	2					6	1	4	1	0	4						
						6	6	0	2	0	3						
1						6	8	5	1	0	5						
1	0					6	9	5	2	0	3						
						6	7	5	2	0	3						
1	0					7	2	0	2	0	3						
						7	1	0	2	0	3						
1						7	3	2	2	0	3						
1	1					6	0	8	1	0	4						

COMMENTS:

Figure C.7. Example of a completed biological sampling form used for escape-ring study sets during the 2001 survey.

APPENDIX C (cont'd)



TAGGING SHEETS

PAGE 1 / 3

VESSEL[4] Ocean Pearl DATE[4] yr. 01 mo. 10 day 08 SET NO.[10] 2

SPECIES[13] SABLEFISH SAMPLE TYPE[16] _____ GEAR[19] _____

TAG TYPES: 1°[21] _____ 2°[23] _____ RECORDER[25] _____

RELEASE AREA N. LAT. [56 57 58 59 60] W. LONG. [61 62 63 64 65] DEPTH (m): 455 4310

LOCALITY:[71] _____ TAGGER[77] _____

M E 0 6

SEQUENCE	PRIMARY TAG NO. 28 29 30	31 32 33 34 35	FORK LENGTH (cm) 36 37 38.39	ERROR 40	CONDITION 41	REC. TANK 42	INJURY 43
	B 9 4	0	1				
		1	1				
		2	2				
		3					
		4					
0		5	6 2 1				
0		6	6 4 6				
		7	6 3 1				
		8	6 0 2				
		9	6 6 9				
		5 0	6 3 5				
0		5 1	7 4 7				
		2	6 2 8				
		3	6 5 2				
		4	7 1 8				
		5	7 0 5			D	
0		6	6 4 2			D	
		7	6 5 1				
0		8	7 0 9				
		9	5 9 8				
		6 0	6 4 7				
		1	6 1 7				
		2	6 5 8				
		3	6 7 5				
		4	6 6 3				
		5	6 4 2				
		6	6 3 1				
		7	6 9 5				
		8	6 6 4				
	3 5 1	6 9	5 9 8				

SEQUENCE	PRIMARY TAG NO. 28 29 30	31 32 33 34 35	FORK LENGTH (cm) 36 37 38.39	ERROR 40	CONDITION 41	REC. TANK 42	INJURY 43
	B 9	3 5 1 7 0	7 4 1				
0		1	6 5 5				
		2	6 9 1				
		3	6 6 5				
		4	5 9 8				
		5	6 5 8				
0		3 5 1 7 6	7 2 4				
		7	6 2 8				
		8	6 6 9				
		9	6 1 7				
		8 0	7 4 9				
		1	6 6 8				
		2	6 1 5				
		3	7 3 9				
		4	7 5 6				
0		5	6 7 1			D	
		6	6 5 9				
		7	6 2 1				
		8	6 6 8				
0		9	6 2 9				
		9 0	6 2 8				
		1	7 0 1				
		2	6 3 9				
		3	6 9 8				
		4	6 7 5				
		5	6 3 2				
		6	6 6 2				
		7	6 7 1				
		8	7 3 0				
	3 5 1	9	5 6 9				

SEQUENCE: 0 = fish data corresponds to tag no. 1 = fish data may not correspond to tag no.

ERROR: U = length unknown T = tag not well implanted B = broken tag P = paired tag (2 tags in 1 fish) D = dead fish R = release of OTC from needle hole

CONDITION: 1 = poor

RECOVERY TANK: T = put in r. tank K = kept in r. tank overnight

INJURY: B = bleeding C = cut, lesion or flesh wound D = dropped on deck E = eye G = gas J = jaw S = scar or healing wound I = other injury M = multiple injury F = fin L = scale loss R = raw around tag O = bleeding at OTC hole N = scrapes, abrasions

AGE VALIDATION: 0 = no injection 3 = 1cc OTC / kg

4 = $\frac{1}{4}$ cc OTC + $\frac{3}{4}$ cc 1% saline / kg 5 = 1cc 1% saline / kg

Figure C.8. Example of a completed tagging form used during the 2001 survey.

APPENDIX D: SABLEFISH GONAD MATURITY STAGES

Maturity Stage	Code	Males	Females
Immature 1	01	very thin string-like >1 mm thick, translucent white colour	thin string-like =1.5mm thick mid-section, translucent-white colour
Immature 2	02	thin string-like 3mm thick, extends length of cavity, white-translucent colour	thickened >5mm, does not extend length of cavity, some folds sausage like translucent-white colour
Ripening 1	03	thick >10mm visible folds, white smooth texture, =20% body cavity	eggs present, white opaque colour encased in translucent sock, <25% of body cavity
Ripening 2	04	as above but with blood vessels present on surface, >30% body cavity	eggs larger =1mm diameter, white in colour, blood vessels present on surface, >25% of body cavity
Ripe	05	as above blood vessels present, folds delicate, some sperm may flow, >40% of body cavity	eggs at least 1mm diameter, white in colour, gonad full size, >50% of body cavity
Ripe 1	06	no stage in males	gonad same size as above but at least 25% of eggs have become translucent
Ripe 2	07	no stage in males	gonad same size as above but at least 50% of eggs have become translucent
Running Ripe	08	lobes fully developed, sperm is released when slight pressure is applied to external posterior region of body cavity	stream of translucent eggs released when slight-moderate pressure is applied to external posterior region of body cavity
Spent	09	lobes or folds are bloodshot, some sperm may be present when moderate pressure is applied to external posterior region of body cavity	gonad is red-purple in colour, residual eggs may be present, outer wall of gonad flaccid
Resorbing	10	no stage in males	eggs present but did not function normally (not normal)
Recovering	11	lobes flat, brown in colour, bloodshot appearance on edges and ends of lobes	still some red purple colour, not flaccid, whitish sheen to exterior surface
Resting	12	firm, light brown colour, some wrinkles on surface	smooth elongated and round in shape, brown purple pulp interior, exterior surface has whitish sheen

APPENDIX E: SETS EXCLUDED FROM THE CATCH RATE PLOTS

The following sets were excluded from the catch rate plots.

Year	Sets	Reason
1990	23	Only two traps hauled, rest lost
1994 Fall South Coast	1	String lost
1994 Fall North Coast	3, 6, 11, 18, 24	Additional traps added to the end of the string for vessel
	38	Lost track of traps
1995 Fall South Coast	8, 9, 11, 12, 28	Tagging set and the total sablefish catch was not recorded
	6, 7, 10	Physiology study
1995 Fall North Coast	11	Trap set every second becket
	15	Gear parted, gear lost, unknown how many traps hauled
	27	Tagging set and the total sablefish catch was not recorded
1996 Spring	3, 8, 9, 11, 12, 14, 15, 17, 18, 20, 21, 27, 30, 42,	Tagging set and the total sablefish catch was not recorded
1996 Fall South Coast	11	Tagging set and the total sablefish catch was not recorded
1997 Fall	8, 9	Tagging set and the total sablefish catch was not recorded
1998	30, 36, 39, 53, 54	Tagging set and the total sablefish catch was not recorded
	13	Lost track of traps
	57	Tangled with another string
1999	105	Trap 22 dumped and catch estimated due to large shark
	97	Lost track of traps
	4, 43	Tagging set and the total sablefish catch was not recorded
	30, 42, 58	Preliminary excluder sets
2000	16, 17, 55	Tagging set and the total sablefish catch was not recorded
	46, 71, 73, 74, 75, 76	Commercial sets
2001	66	Inadvertently set over top of another vessels set of trap gear
	105	String lost

APPENDIX F: DETAILS ON SABLEFISH CATCH AND NUMBERS RECOVERED, SAMPLED AND TAGGED DURING THE 2001 SURVEY.

Sablefish sampled during tagging and index set were sampled for fork length, sex, maturity, and otolith (LSMO) and for some sets the stomach contents were also examined. Sablefish sampled during escape-ring study sets (indicated by an asterisk (*)) were only sampled for LSM.

Set	Count	Weight	Recovered	Tagged	Sampled	Stomachs	Proportion Males
1	201	664	0	0	202*	0	0.45
2	644	1855	5	639	0	-	-
3	18	77	0	0	18	0	0.00
4	20	83	0	0	20	0	0.05
5	81	336	0	0	81	0	0.00
6	132	343	0	77	54	0	0.41
7	198	436	0	143	54	0	0.61
8	66	143	1	33	32	30	0.73
9	4	9	0	0	3	3	0.33
10	16	38	0	0	16	16	0.50
11	355	729	24	284	47	0	0.68
12	593	1211	44	549	0	-	-
13	483	1089	33	450	0	-	-
14	481	941	0	481	0	-	-
15	546	1327	9	467	70	0	0.59
16	726	1708	34	692	0	-	-
17	733	1496	49	684	0	-	-
18	805	1637	40	765	0	-	-
19	66	190	0	0	65*	0	0.63
20	187	434	0	0	187*	0	0.77
21	306	870	3	303	0	-	-
22	1	4	0	0	1	0	0.00
23	3	8	0	0	3	0	0.00
24	42	115	0	0	41	0	0.27
25	101	241	1	45	55	53	0.38
26	22	50	0	0	22	0	0.59
27	21	42	0	0	21	21	0.67
28	6	19	0	0	6	0	0.83
29	42	146	0	0	44	44	0.34
30	144	299	0	92	52	52	0.77
31	147	264	1	96	50	0	0.82
32	41	82	0	0	41	41	0.68
33	22	55	0	0	22	0	0.55
34	35	105	0	0	35	35	0.37
35	473	1007	2	471	0	-	-
36	38	133	0	0	38	0	0.11
37	18	71	0	0	18	0	0.00
38	12	49	0	0	12	0	0.00
39	281	638	21	260	0	-	-
40	390	1053	3	387	0	-	-
41	446	1194	3	392	51	0	0.45

APPENDIX F (cont'd)

Set	Count	Weight	Recovered	Tagged	Sampled	Stomachs	Proportion Males
42	139	333	7	132	0	-	-
43	183	689	0	0	180*	0	0.38
44	263	878	0	0	264*	0	0.28
45	504	1395	7	497	0	-	-
46	12	41	0	0	12	12	0.25
47	14	45	0	0	15	0	0.53
48	13	29	0	0	13	13	0.92
49	18	47	0	0	18	0	0.67
50	24	84	1	0	23	23	0.39
51	586	1225	57	529	0	-	-
52	875	1762	114	710	51	0	0.78
53	961	1939	74	887	0	-	-
54	790		6	-	-	-	-
55	70	199	0	0	69*	0	0.63
56	552	1381	26	526	0	-	-
57	4	11	0	0	4	0	0.25
58	16	37	0	0	16	16	0.81
59	3	11	0	0	3	3	0.00
60	68	163	0	26	43	0	0.81
61	26	75	0	0	26	26	0.46
62	113	358	0	0	112*	0	0.74
63	5	21	0	0	5	5	0.40
64	16	63	0	0	16	16	0.38
65	3	16	0	0	3	3	0.00
66	1	2	0	0	1	0	1.00
67	87	251	1	86	0	-	-
68	9	25	0	0	9	0	0.78
69	9	24	0	0	9	9	0.11
70	18	57	1	0	17	17	0.53
71	10	32	0	0	11	11	0.36
72	14	64	0	0	14	14	0.07
73	1	4	0	0	1	1	0.00
74	4	18	0	0	4	4	0.25
75	218	717	3	215	0	-	-
76	243	850	5	238	0	-	-
77	37	191	1	0	36	0	0.11
78	392	1485	11	332	49	0	0.67
79	53	247	0	0	54	0	0.30
80	341	1156	2	339	0	-	-
81	13	59	0	0	13	13	0.08
82	25	107	0	0	25	0	0.36
83	0	0	-	-	-	-	-
84	8	39	0	0	8	8	0.13
85	11	33	0	0	11	11	0.36
86	16	42	1	0	15	15	0.80
87	6	14	0	0	6	6	0.83
88	4	12	0	0	4	4	0.50
89	10	29	0	0	10	10	0.90

APPENDIX F (cont'd)

Set	Count	Weight	Recovered	Tagged	Sampled	Stomachs	Proportion Males
90	566	1558	9	557	0	-	-
91	35	97	2	0	35*	0	0.57
92	489	989	84	405	0	-	-
93	387	797	67	269	51	0	0.80
94	357	716	43	314	0	-	-
95	379	813	9	370	0	-	-
96	7	21	0	0	7	7	0.14
97	10	34	0	0	10	10	0.60
98	270	634	0	270	0	-	-
99	2	4	0	0	2	2	1.00
100	18	41	0	0	15	15	0.40
101	15	56	0	0	15	15	0.13
102	0	0	-	-	-	-	-
103	198	536	0	0	199	0	0.55
104	5	20	0	0	5	5	0.40
105	lost	-	-	-	-	-	-
106	0	0	-	-	-	-	-
107	0	0	-	-	-	-	-
108	7	22	0	0	7	7	0.43
109	141	371	0	141	0	-	-
110	10	28	0	0	10	10	0.80
111	4	13	0	0	4	4	0.50
112	2	3	0	0	2	2	1.00
113	9	26	0	0	9	9	0.56
114	2	11	0	0	2	2	0.00
115	356	709	0	290	67	67	0.21
116	380	800	3	317	60	59	0.17
117	343	911	5	282	53	0	0.10
118	231	702	6	172	47	0	0.09
119	245	734	5	190	46	0	0.11
120	336	789	7	268	52	0	0.25
121	315	723	9	228	73	0	0.11
122	271	635	7	216	49	49	0.12
123	318	693	4	267	48	45	0.55
124	407	906	14	322	52	0	0.42
125	244	609	3	180	56	0	0.11
126	115	251	3	60	52	52	0.33
127	296	782	11	235	53	0	0.28
128	291	739	3	236	52	0	0.52
129	259	655	6	200	50	50	0.16
130	112	247	1	66	47	47	0.21
131	339	671	7	267	64	0	0.35
132	175	377	4	120	51	51	0.37
133	175	390	1	121	53	0	0.30
134	113	268	2	58	54	54	0.32
Total	**23,968**	**56,832**	**905**	**18,248**	**2,869**	**1,097**	**0.42**

APPENDIX G: FORK LENGTH FREQUENCY DISTRIBUTIONS OF SABLEFISH SAMPLED AND TAGGED DURING THE 2001 SURVEY

The following figures show fork length frequency distributions of sablefish sampled and tagged during the 2001 surveys. Panels are arranged in the order that the localities were visited. Escapering sets are shown separately from the indexing and tagging sets. Each panel in a figure shows a histogram for males, females, or unknown sex sablefish at the indicated locality. The solid vertical line in each panel represents the mean fork length. The sample size for the length frequency is indicated in the upper right of each panel.

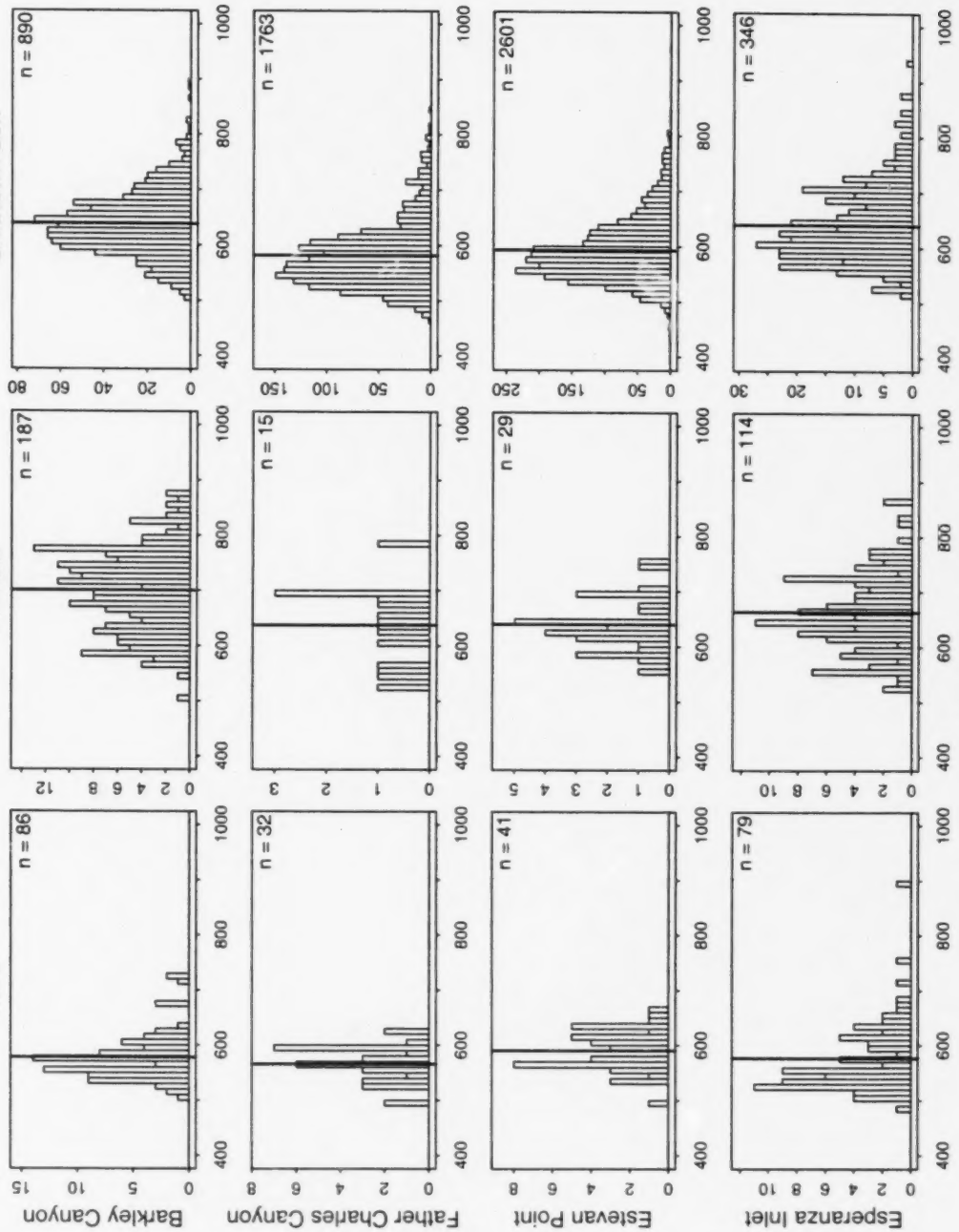


Figure G.1. Indexing and tagging sets.

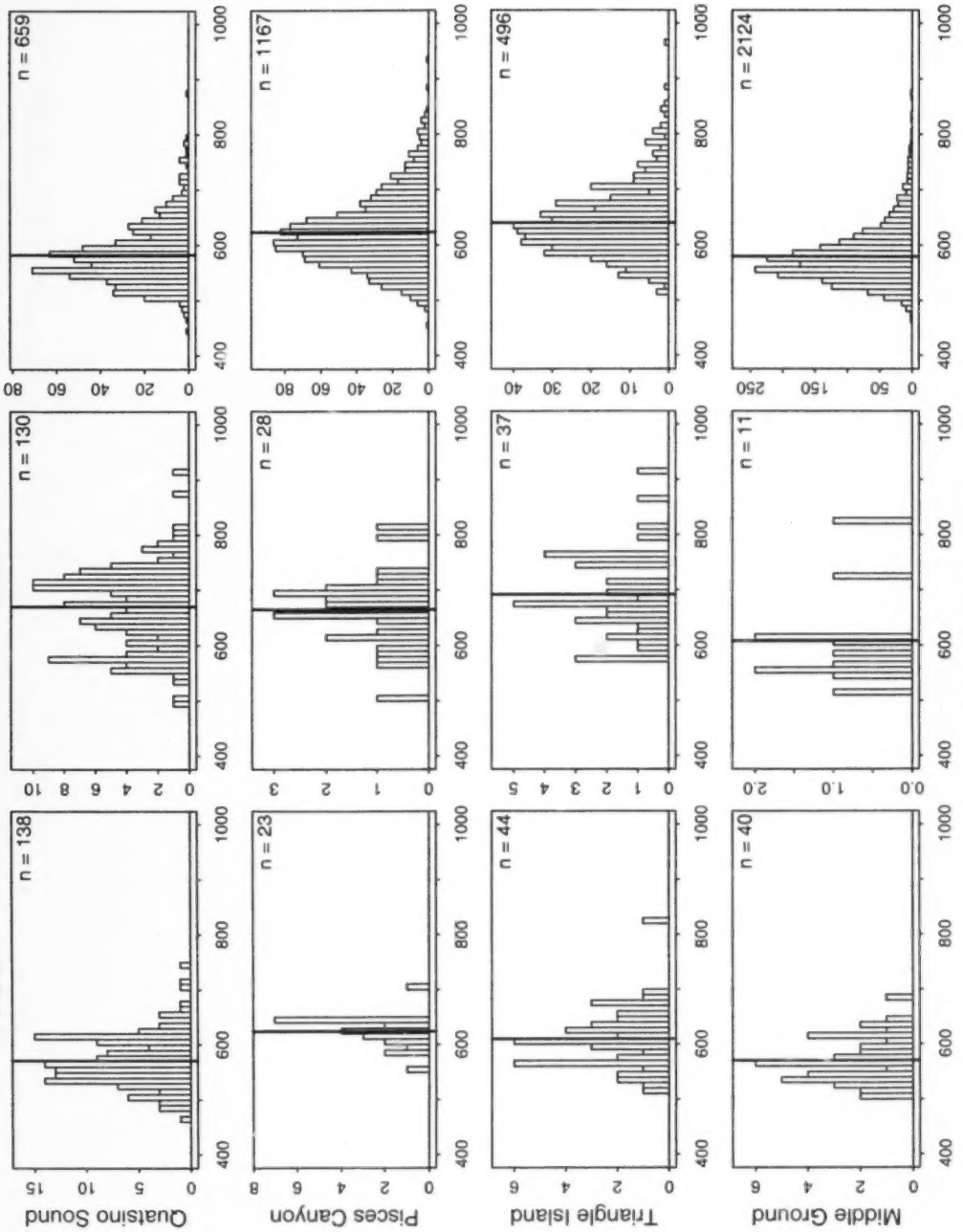


Figure G.1. (cont'd)

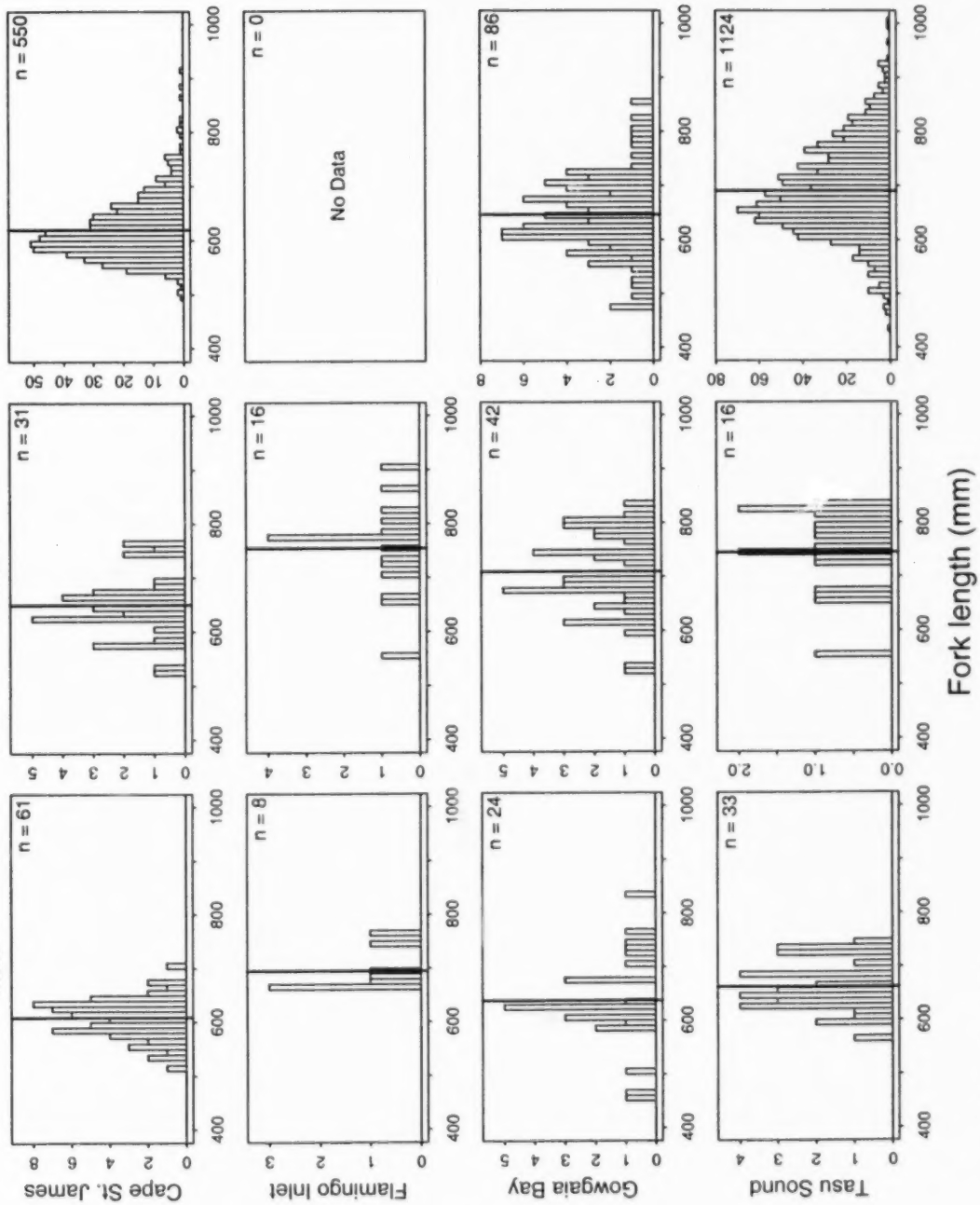


Figure G.1. (cont'd)

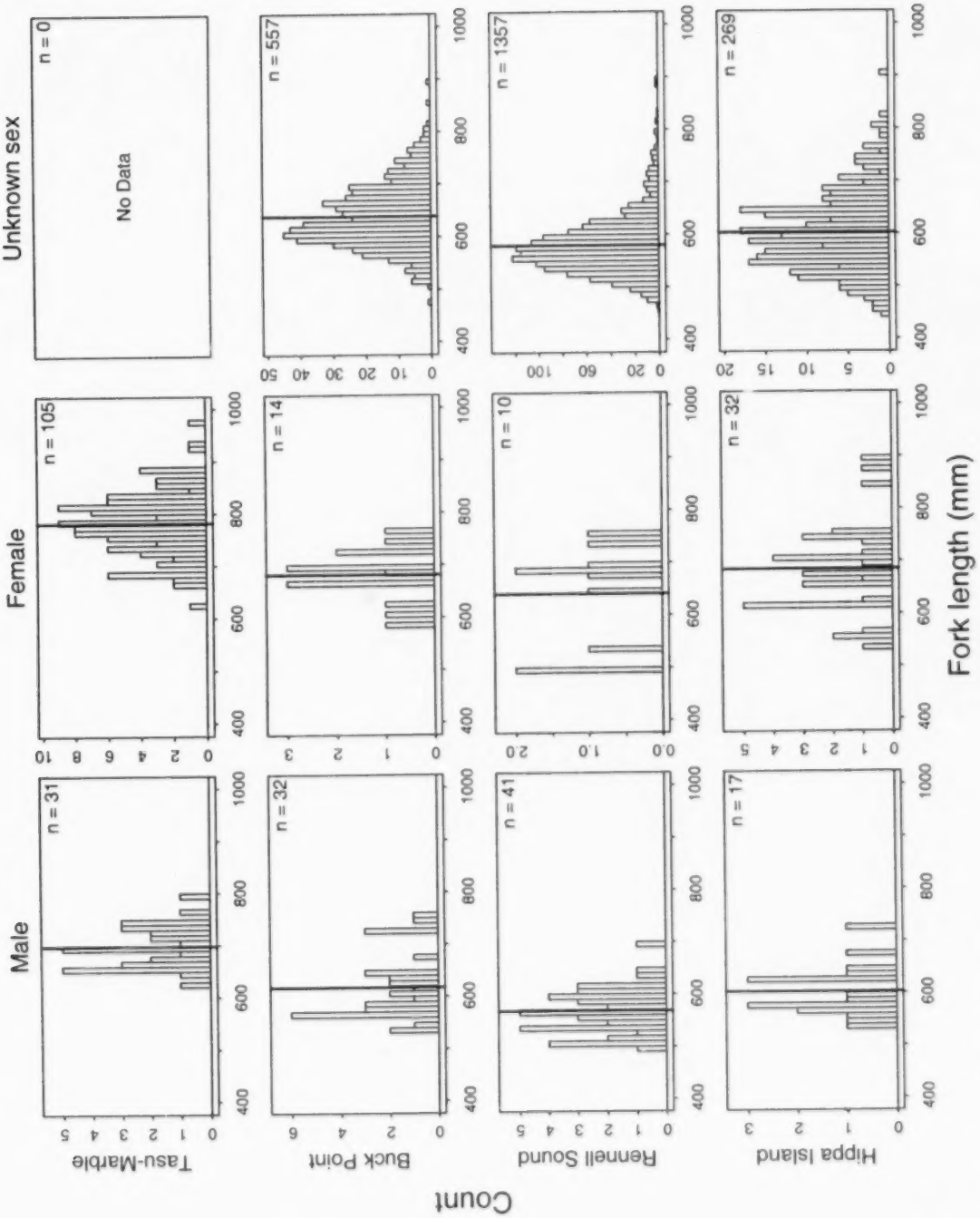


Figure G.1. (cont'd)

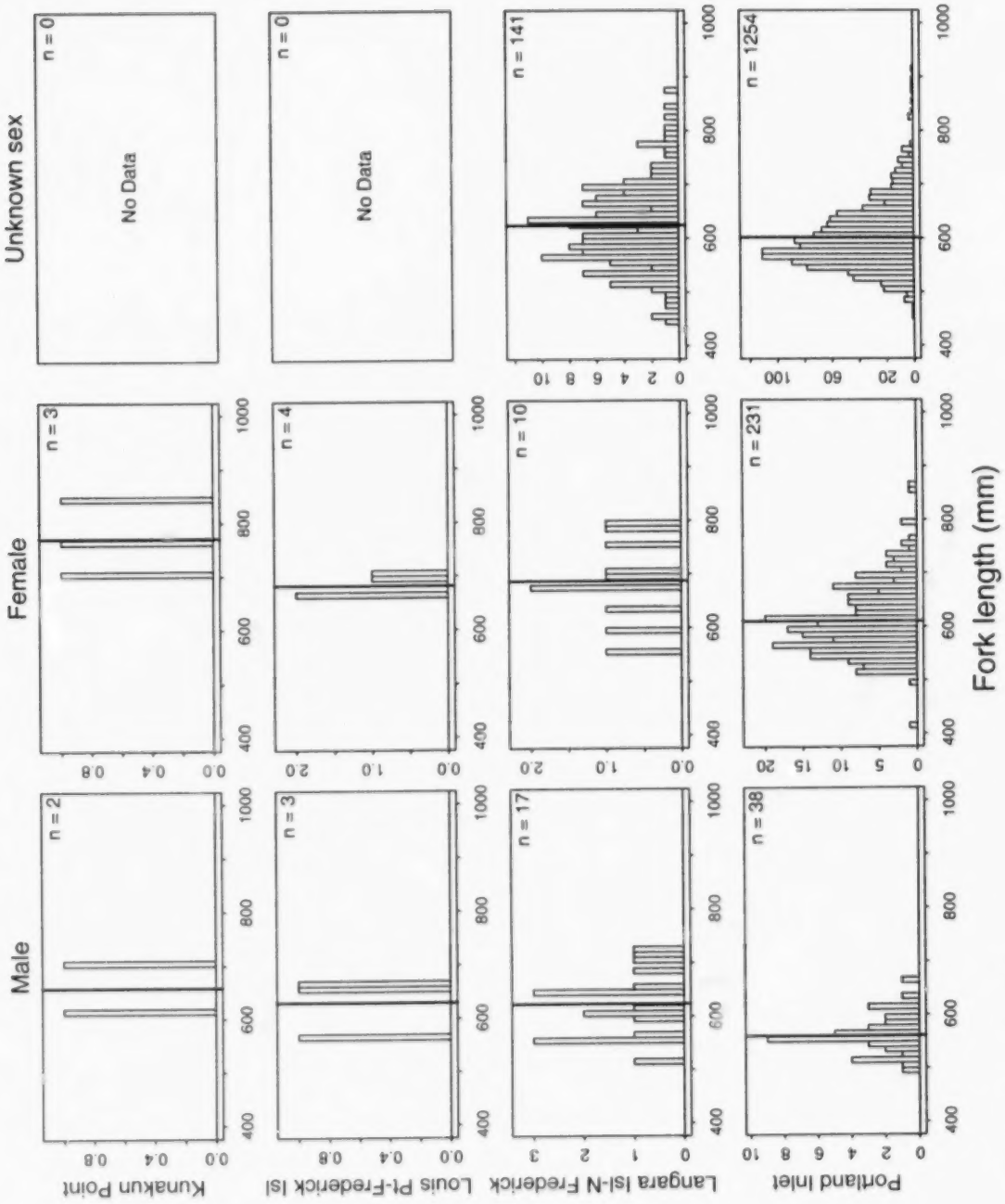


Figure G.1. (cont'd)

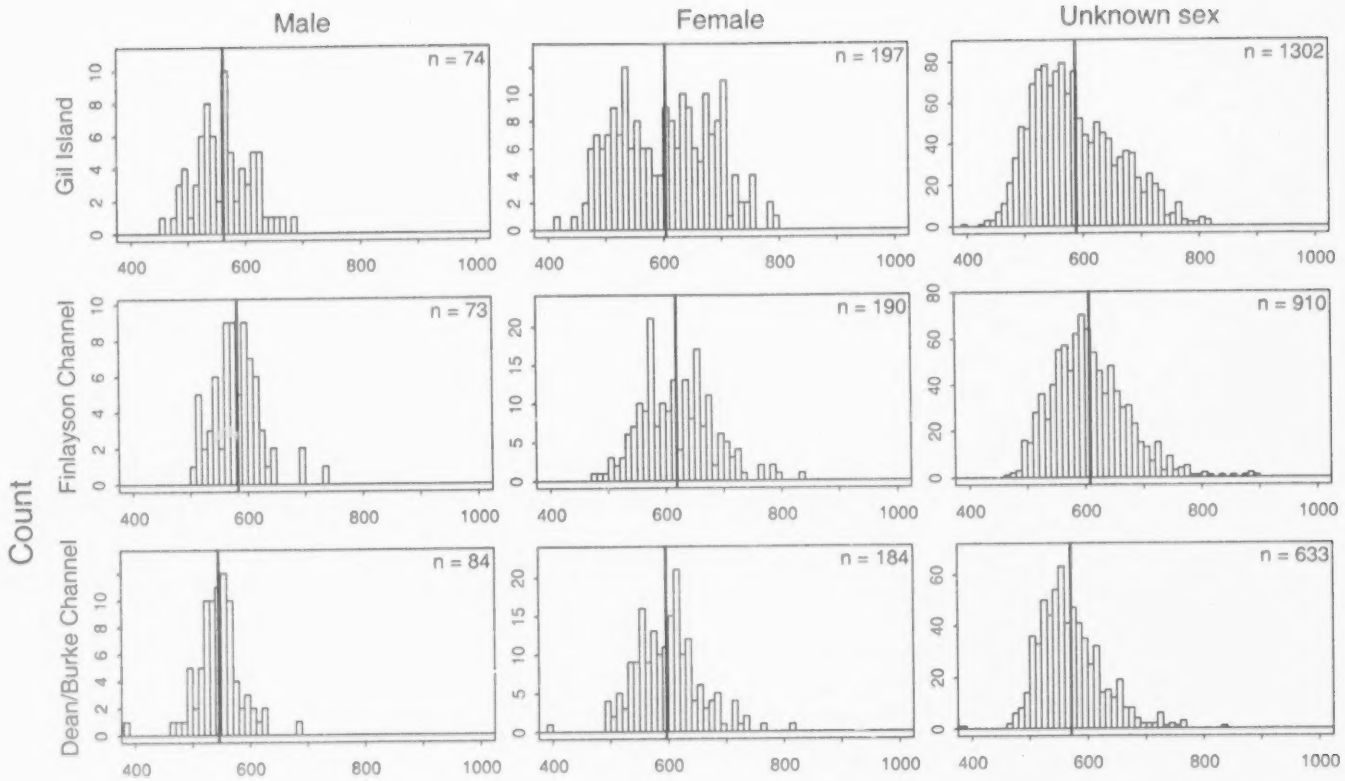


Figure G.1. (cont'd)

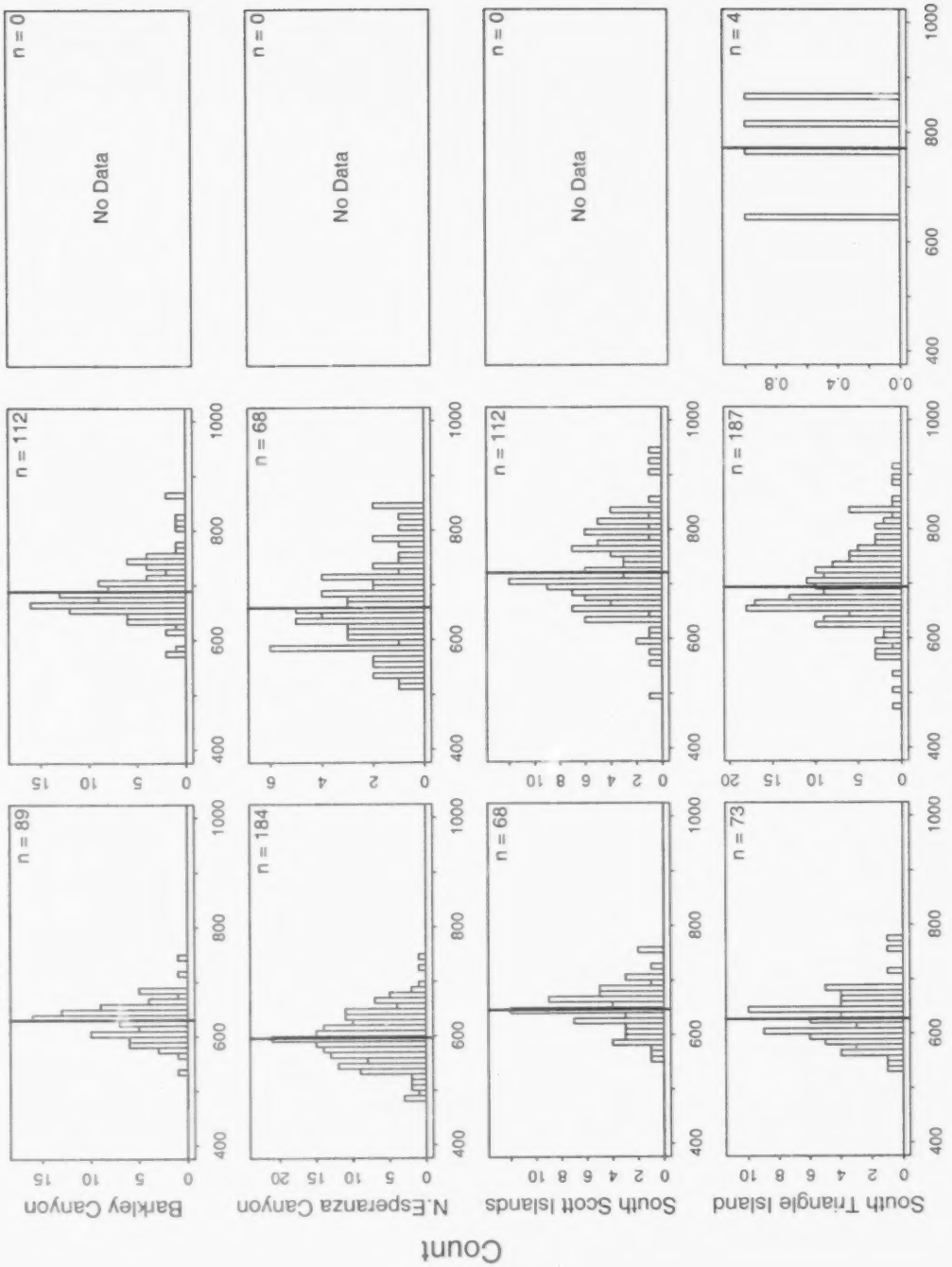


Figure G.2. Escape-ring sets.

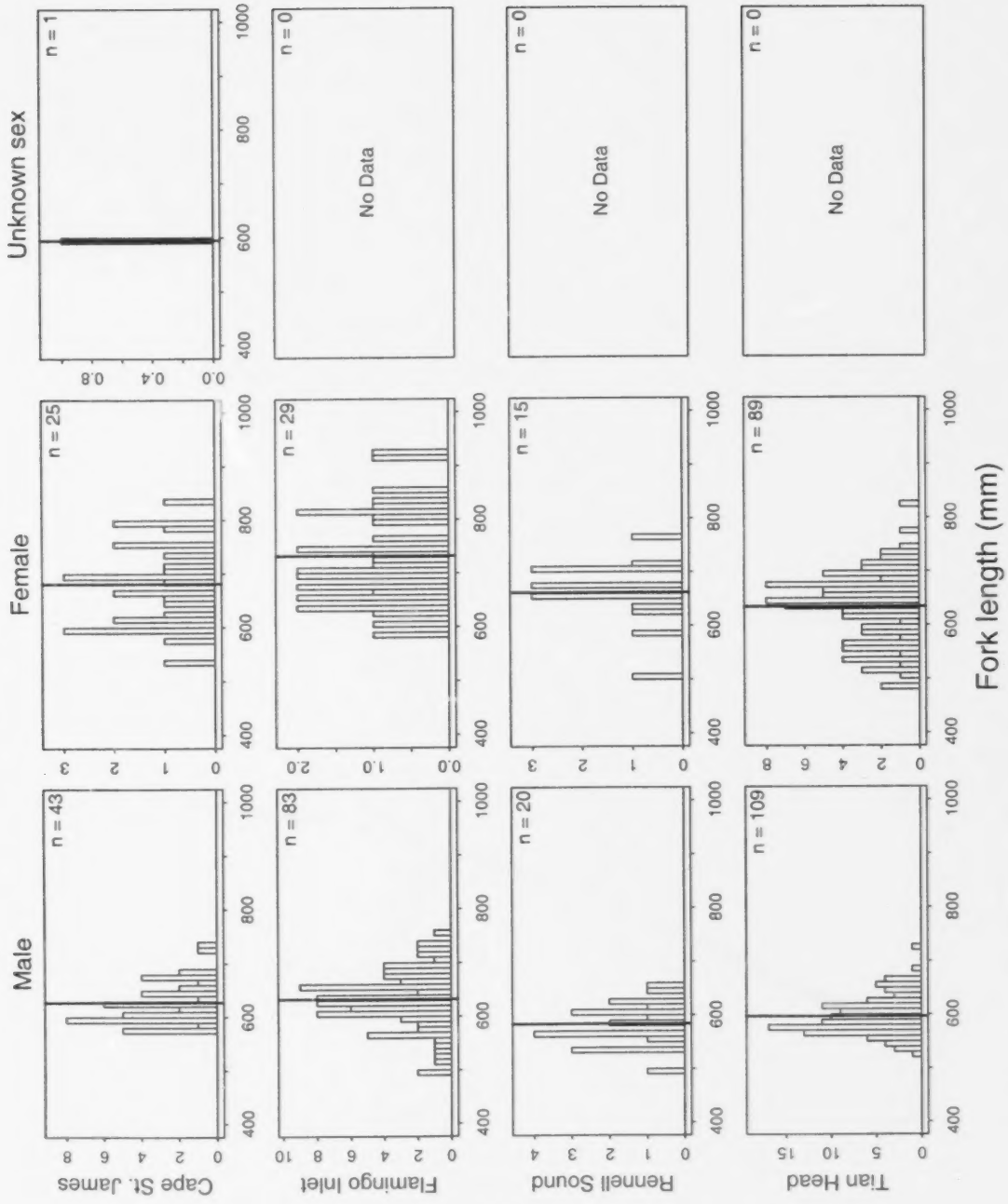


Figure G.2. (cont'd)